

THE CONNECTED DIGITAL HOME OVERVIEW



Introduction.

The purpose of this report is to highlight to the reader the possible influence of technology advances. In terms of computer technology, consumer electronic products, the development of information technology infrastructure and increased communications all within the confines of a normal home.

1. Existing Technology within the Home.

This section will examine, explain and review existing technology, consumer electronic devices, domestic appliances, interoperability of devices, and the Internet and consumer behaviour.

2. Introduction of New Technology into a Home.

This provides the background, system overview, improvements in interconnectivity theories, home networking, consumer benefits, cost savings and home security.

3. Summary Conclusions

1. Existing Technology in a Home & limitations

The normal home has a collection of household devices and appliances, which are fragmented in terms of exchanging data, information and knowledge between devices.

In the UK approx 60% of homes have a least one personal computer, 9 million have some form of digital television, 2.3 million homes have a broadband connection. In most of the 22 million UK homes, there is a telephone, on average 2.5 televisions, a central heating system with a controller, a security system, music centres/stereos, domestic white good appliances. The consumer also has a requirement for viewing and managing many different digital media devices, information, audio, pictures and text.

More importantly each system can be deemed as closed systems i.e. heating system or fridge and unable to be controlled remotely or data received or transmitted from such products.

Further examples are:

- Utility meters
- Televisions
- DVD players
- Security systems
- Washing machine

The concept of the Digital Connected Home is a good example of the flow of data, information and the knowledge (via interpretation) of a networked, interconnected, control and interoperability of household appliances and devices. The purpose is to provide users with control, an easier lifestyle, greater choice of entertainment style and format, for example: music, television, video on demand, DVD, VCR, internet, plus there should be more control over household functions, appliances, security system; both remotely and via a master control panel or remote control or both and hopefully a less stressful lifestyle. The networked home will be a combination of wireless (i.e. Bluetooth), powerline modems (utilising electricity ring main architecture) and wired networked devices (Ethernet based standard). There are limitations on wireless devices and base stations transmitting through solid walls, hence a number of networking transmission processes will be required.

2. Introduction of New Technology into a Home.

The objective is to provide open systems for interoperable-networked devices in the home.

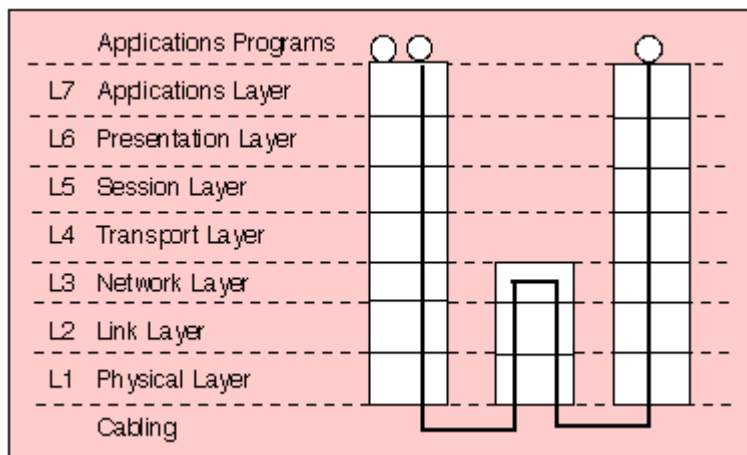
In order to provide interoperability in the digital home, there must be the following:

1. Industry collaboration.
2. Standards- based interoperability framework
3. Value products and compelling, affordable consumer products.
4. Ease of use and installation.

The digital home will consist interconnectivity between personal computers, Internet broadband, networking both wireless and wired, heating systems, security, video on demand, music on demand, remote access to any electronic devices in the home, digital set top box, and hard disk server based set top boxes, mobile phone, printers, televisions, game consoles, downloading and sharing of information, pictures, text, objects, music and video across the connected home.

The OSI reference Model

The intelligent house can be seen to adopt the OSI model as a reference to exchange and transmit data, information and knowledge. All the main elements of the OSI layers are incorporated in the intelligent house. These being:



The seven layers of the OSI reference model showing a connection between two end systems communicating using one intermediate

It is anticipated that Industry collaboration between organisations will lead to an industry standards for hardware, software and protocols for developed products for the Intelligent home.

Organisation such as the Zigbee alliance and DNLA has been established to develop open standards for the Digital Connected Home.

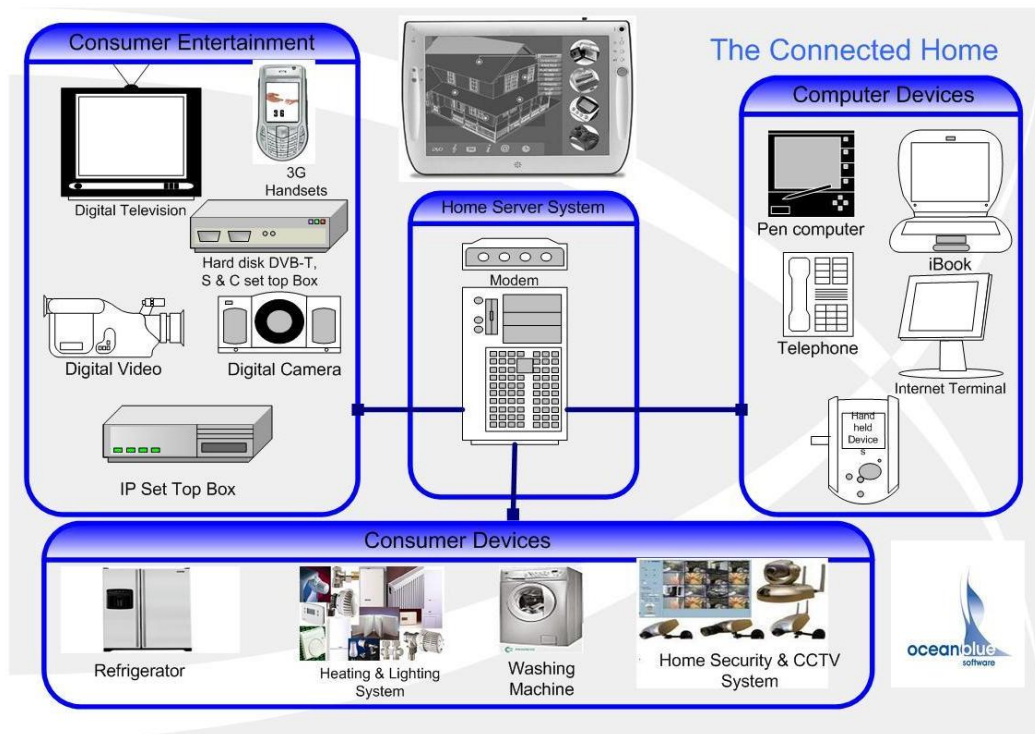
Hardware Architecture & Back Up Systems

The Digital Connected Home is a network of devices, each sending a receiving data to a central system. The central system may consist of a personal computer or set top box or a combination of both. The Control system will log all data, information, pictures, and video film. The data & information will include times; dates and locations of alarm alerts will be logged. The total system will be monitored by the central system and data constantly fed back to parameter files to check the status of each appliance and device on the network.

New devices and technology can be introduced to the network as and when required. The system will be primarily an open system therefore hardware components should be interchangeable and low cost. The central system will have a failsafe back up

system via another hard disk, which will take a mirror image of the active system hard drive every night. Therefore if the systems hard disk fails the backup hard disk can be online and operational with hours. The system can also notify the owner when the hard disk is liable to fail, by utilising planned maintenance process and regular hard dish software tools to analysis the efficiency of the hard disk. Data & information is collected and regular status reports are sent to the owner and his computer-servicing computer. These reports are automatically compared to a set of parameters on the central control system and alerts can sent as and when data files fall outside the set guidelines.

Ocean Blue Vision of the Future Digital Connected Home



Applications & Functions of the Digital Connected Home.

For example include the home user could remotely call using a mobile phone to the Digital Connected Home master control, then send a data string command to switch the heating on and check the home CCTV security camera with images, data & information (such as: date, time camera angle & position) being sent back to the mobile phone. The user can then interpret the data and information. Therefore an activated process is enacted based on remotely sent commands and the heating system, when switched on, will work within predefined set of parameters.

- Internet enabled utility meters could send meter readings via the Internet.
- Personal computer or hard disk set top box could act as part of a home files server and a central repository of data, information and software programs.
- Internet intelligent enabled fridges would detect usage from fridge and automatically reorder goods.

- Video on demand via broadband, films could be stored on a hard disk and played using the television as and when required.
- Neighbourhood talk, a conceptual idea of local districts organising and sharing data, information and knowledge on local events, weather conditions, security aspects etc.

Security System

In the case of the Digital Connected Home data, information and knowledge are important elements when applied to the security system of the Intelligent Home.

For example outside smoke sensors and CCTV combined motion detectors cameras detect movement and sensors detect smoke, these devices will send back blocks of data, which are logged in the alarm control system. The alarm system will check the received data against parameter files within a database system, held on a personal computer or set top box. This will determine if the motion detected is for example a mouse or if the smoke detected is actually a passing car's exhaust fumes.

These data alerts can also be monitored and seen by the user in the house, in which case the homeowner can interpret the data & information and make a knowledge-based decision.

Also if the parameters are established and the data found to be outside the parameter file, the master alarm control can activate a data & information string, comprising of images, pictures and information (previously recorded on the hard disk system) to a police station notifying a breach of the parameters and possibly security problem.

The homeowner could also be notified of a security breach via a predefined text message sent to his/her mobile phone, with relevant copies of images, pictures and information and the user can decide from the data and information to make a knowledge-based judgemental decision.

The same system will also monitor data and information from other connected devices of the security system such as doors, gates, roof, and feed back constant data and information as to the status of each device.

Interpretation, Noise & Wisdom

To verify what we have in the Digital Connected home, which is a large interconnected network of different devices connected to a central control/nervous system with external connections to the outside world, utilities, police and medical authorities and the home owners as examples.

There are environmental aspects and noise elements which can play a part in activating the alarm system to send data & information back to the central control system, which maybe relevant and true or it could be false.

For example noise, which can be perceived as unstructured data and therefore does not fit within parameters. An example of noise would be the alarm system detecting the movement of a large bird flying low (noise) and the CCTV cameras would record this event. The data & information will be sent to the central alarm system for

checking within the parameters, the alarm system has perceived a security breach and sent a predefined message with data & information to a police station and also to the owner.

The owner can use his knowledge and wisdom to interpret and question the data & information received as to whether there has been a breach of security and to reject or process the alarm alert.

3. Summary Conclusions:

The relevance and usefulness of introducing computer technology both hardware & software, networking of household appliances and devices is most interesting and desirable if it provides the consumer with more choice, a better lifestyle, increased knowledge and less stress and provided the following applies to implement an Digital Connected Home.

- Open systems & Industry standard product
- Interoperability of devices
- Value for money products.
- Low cost Installation of network via combination of wireless and wired networks.
- Low cost network devices.
- Ease of use, for & by consumers
- Low cost maintenance.
- Consumer desired applications.
- Reliable, robust software applications.
- Reliable computer hardware devices.
- Easy to use software and hardware error checking applications

Ocean Blue Software

Ocean Blue software provides world class middleware software solutions for Digital Video Broadcasting (DVB) devices, which include Digital set top boxes, integrated televisions, IP set top boxes, mobile phones and hand held TV consumer products.

www.oceanbluesoftware.co.uk