

ISO / IEC JTC 1/SC 25/WG 1
Interconnection of Information Technology Equipment
Home Electronic System

- Title:** Attachment to the New Work Item Proposal on:
Guidelines for Product Interoperability via a Distributed
Communications Network
- Source:** United States and SC 25/WG1
- Project:** Proposed project for Working Group 1
Reserved project number 25.01.07
- Requested Action:** Approval of NWIP by JTC 1 as requested for by SC 25 with
resolution 09/14, see SC 25 N 475.
- Reason:** Interoperability is essential for integrated home control
applications.
- Distribution:** JTC 1 and SC 25/WG 1

**Attachment to the Proposal for New Work for
Working Group 1, *Home Electronic System*, on:**

**GUIDELINES FOR PRODUCT INTEROPERABILITY
VIA A DISTRIBUTED COMMUNICATIONS NETWORK**

1 Introduction

The assigned projects of SC25/WG1 are intended to allow products to communicate via a variety of home control systems while using a standard protocol (the *Home Electronic System* standard, HES) and standard communications interfaces (the HES Universal Interface and Simple Interface). The term *products* includes appliances¹, sensors, switches, actuators, controllers, and user interfaces. Incorporation of the HES standard into product design will reduce the complexity of adapting these products to operate on home control networks and encourage the growth of the home automation industry.

In the course of writing sections of the HES standard, WG1 has created and published models of common applications systems, such as lighting and energy management. Based on interest in this work from outside WG1, WG1 has decided that these models are addressing important issues of product interoperability. Therefore, WG1 proposes a formal new work item on this topic that extends beyond creating application models, as described herein.

Our houses are full of isolated appliances. Most of them are a self-contained machines with some mechanics or electronics to cook, clean, entertain, etc. Each has some sort of control panel, or a remote control device, perhaps some sensors to detect temperature or light level, and usually a controller to run the machine. For proper appliance operation, the user needs to learn the particular functions of each control panel or remote control unit. The power cord, and sometimes a radio or TV signal source, often are the only connections from the appliance to the outside world.

Intelligent appliances should be capable of interaction with related appliances and auxiliary components, such as sensors, actuators, and control panels. Such appliances also should have the option to interact with products external to the house using the HomeGate residential gateway standard under development by WG1. Appliances and other products that are functionally related to a common application may communicate and interoperate with each other, as shown in Figure 1. Alternatively, these appliances may communicate with a Cluster Controller (Figure 2) that organizes and supervises the application, and interacts with other Cluster Controllers. (Communications among appliances and Cluster Controllers is facilitated by the HES standard.)

¹ The appliance industry categorizes appliances as *white goods*, *brown goods*, and *traveling goods*. *White goods* are large appliances, such as refrigerators, ranges, ovens, dishwashers, and laundry cleaning machines. This name originated from the white enameled cabinets in which such appliances were first sold. Products that were once contained in wooden cabinets, such as audio/video equipment, are called *brown goods*. All small portable appliances are in the *traveling goods* category.

A Cluster Controller could be specialized for a home automation application, such as lighting, security, or energy management. The introduction of Cluster Controllers does not necessarily alter familiar appliances. Appliances may continue to operate autonomously. When a new appliance is installed, the Cluster Controller might “introduce” this appliance to the other products in the cluster and establish associations that enable new functions and services beyond those of individual appliances. The Cluster Controller may be a separate unit or incorporated into one of the member appliances of the cluster.

The principle of designing for home automation is not to replace all our appliances with a centralized machine that does everything. This approach not been successful for all applications in the office or in the factory. The central computer facility for the enterprise is now supplemented by applications based on distributed intelligence connected to a network. The same concepts apply to home automation. Appliances shall be able to operate independently, as now, or cooperatively if a home automation network and other appropriate products are available. Applications shall be able to share resources. For example, the same motion sensor may supply inputs to applications for climate control, intrusion detection, and child activity monitoring. Appliance cooperation implies some common intelligence among related products. It is not recommended that this intelligence be centralized, nor is it likely that every appliance will know about the capabilities of every other appliance.

2 Designing for Home Automation

The concept of product interoperability must be considered when designing appliances for a home automation environment. Any company seriously investigating home automation should examine their own products or appliances carefully. Among the key issues are:

- Can current product functions be enhanced by external data and remote control?
- With what other products should my product communicate?
- Which internal functions of my product should be accessible for remote control?
- Should any components of this product or appliance be physically separated?
- Would my sales increase if my product communicated with others, including my competition?
- How would product interaction affect the user interface?

Note that none of these issues depends on the particular home control network chosen to interconnect the products.

3 Proposal

The focus of WG1 has been on a universal language and a universal interface to facilitate product connection to a variety of home control networks. The universal language has been under development by the Working Party on Applications and Management. To validate proposals for a universal language, WG1 has created application models that are independent of any language or network. We propose extending this work under a new work item, "Guidelines for Product Interoperability via a Distributed Communications Network." The charter of this assignment would be:

Specify procedures that facilitate the management of products and applications as products are connected to and removed from a home control network. Among the goals of this specification are guidelines that provide an automated method for a newly attached product to

- Announce the capabilities of the new product to other products already on the network including possibly a cluster controller.
- Determine those capabilities of other products that could alter the capabilities of the new product.
- Program the new product to communicate with other relevant products or a cluster controller.
- Define management messages or reports necessary to implement product interoperability.
- Specify messages and reports to be exchanged among cluster controllers or clusters of products that constitute a coordinated application.

4 Initial Work Product

The need for a uniform interoperability methodology has been acknowledged by the CEBus® Industry Council (CIC) The goal is to provide tools for manufacturers to develop products that can interoperate without any complex user installation procedures. The CIC has launched the Home Plug and Play™ initiative to broaden the market for home automation and to define how appliances communicate for integrated applications.

The CIC is offering to WG1 Version 1.0 of the Home Plug and Play specification as a starting point for establishing guidelines for interoperability. The specification may be accessed from the CIC web site at www.cebus.org.

The United States proposes to initiate work on interoperability by introducing the Home Plug and Play specification for consideration by WG1. Please note that the CIC committees writing this document have read some of the WG1 application models and have included relevant concepts in their work. Therefore, we may find that the CIC work is applicable to our goals of product interoperability.

As part of this work item, WG1 expects to seek similar inputs on product interoperability from national and industrial bodies in other countries, as well. Since the charter of WG1 includes building control systems, WG1 has been examining automation in mixed-use commercial/residential buildings. Therefore, WG1 will investigate product interoperability in this environment as part of the proposed new work item.

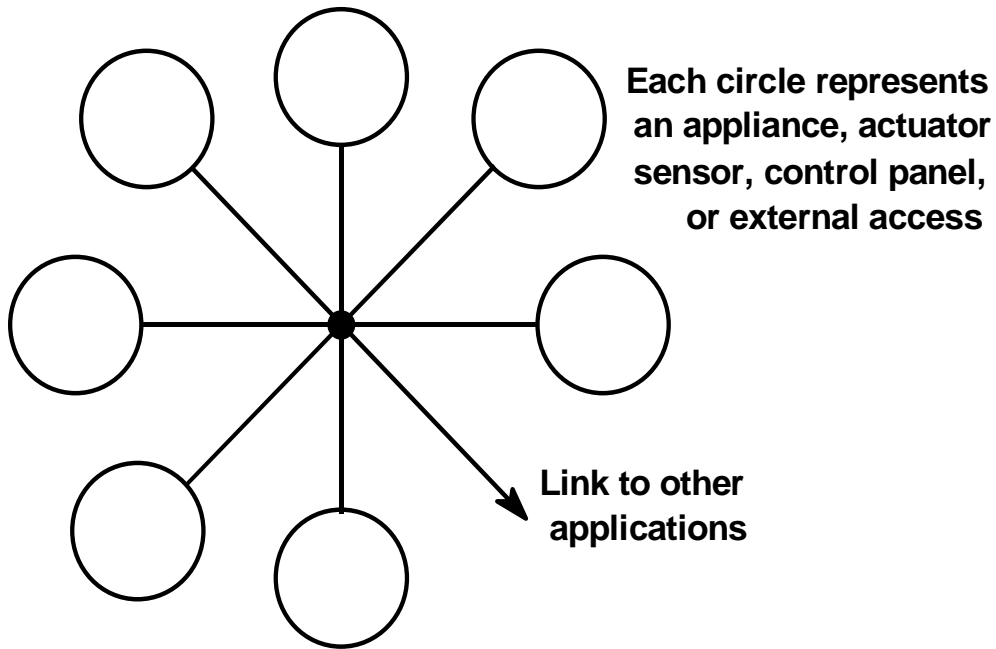


Figure 1 - Logical Architecture of an Application with Distributed Control

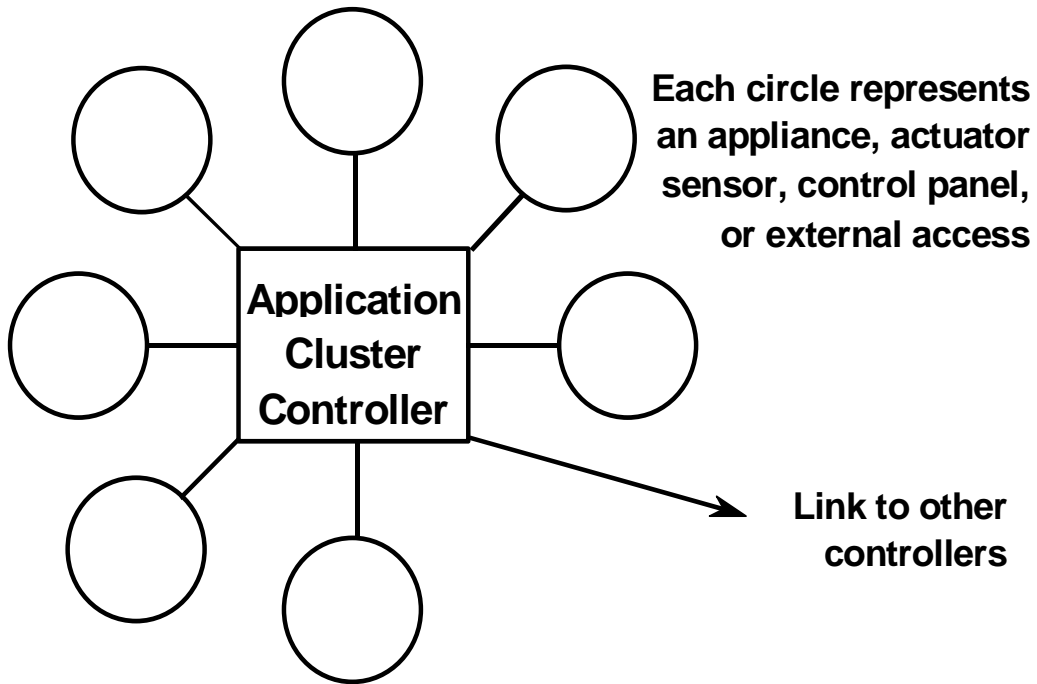


Figure 2 - Logical Architecture of an Application Organized by a Cluster Controller