



TAHI INTEROPERABILITY FRAMEWORK INITIATIVE

TAHI will be launching an Interoperability Framework Initiative at the TAHI Forum on 12th February that will create a high level, cross sector Interoperability Framework Standard and then work to promote the standard, implement its use in the market sectors operating in the Digital Home.

WHAT ARE THE COMMERCIAL DRIVERS?

At a recent meeting in Brussels of the Networked Electronic Media European Technology Platform (NEM) General Assembly it was suggested that the market for services and products in the digital home for this sector alone could be worth €600 Billion.

Given that in a few years there will be perhaps one Billion digital homes worldwide and there is a multitude of products and services that will address this market, the potential market value is huge as every one £ or \$ or € that sells into every digital home represents 1 Billion in sales.

ARE THERE ANY BARRIERS?

People will only buy products if they can be sure they will work in their Digital Homes. We will only achieve this market if products and services in the home can work, and work together, reliably and simply – that they can interoperate. If they don't work reliably together, the market will stall. The TAHI Interoperability Framework Initiative is an opportunity for the UK to take the lead in making this happen, to its benefit and for British Industry.

WHAT IS INTEROPERABILITY?

Interoperability is the ability of dissimilar things to work together, to interwork, to share resources and information and to be able to utilise that information.

Interoperability is the ability of two or more networks, systems, devices, applications or components to exchange information between them and use the information so exchanged. In our globalised society and given the increasing diversity of systems and applications, interoperability makes possible the development of a mass market and avoids the undesirable effects of fragmentation. In this context, standards are a key tool to reach a satisfactory level of interoperability amongst the global market. This is why interoperability is the key to international business!

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What do we mean by Interoperability?

Some definitions:

“The ability of devices, systems, applications and services to work together interactively in an environment in a reliable and predictable fashion”

“The ability of two or more systems, or components to exchange information, and to use the information that has been exchanged.” (IEEE)

“The ability of one computer system to control another, even though the two systems are made by different manufacturers.”

“The ability of different types of computers, networks, operating systems, and applications to work together effectively, without prior communication, in order to exchange information in a useful and meaningful manner.”

“The ability of information systems to operate in conjunction with each other encompassing communication protocols, hardware software, application, and data compatibility layers.”

“The ability to transfer and use information in a uniform and efficient manner across multiple organisations and information technology systems. It underpins the level of benefits accruing to enterprises, government and the wider economy through e-commerce.”

“The ability of two or more entities to communicate and co-operate despite differences in the implementation language, the execution environment and/or the model abstraction.”

“The ability of devices to exchange commands via the higher layers resulting in meaningful actions.”

WHY IS INTEROPERABILITY IMPORTANT?

We are becoming increasingly dependent on electronic and communicating systems. Until the last 20 years most electrical and electronic systems (outside of highly specified systems such as avionics) were self contained and were not able easily (and did not need to) communicate with one another. Convergence of communication, systems, networks and services has changed this. In most environments, multiple services and systems need to share resources and may need to “know” about other systems and services and what resources or information they can provide.

WHY IS INTEROPERABILITY IMPORTANT IN THE DIGITAL HOME?

We are already seeing a number of dissimilar systems in the home (the entertainment system, the telecommunication system and often security systems and the PC Network). These operate independently of one another although they may use one another’s resources and already there is significant convergence between these systems.

Convergence is driving systems to work together in an interoperable manner. Almost all electrical devices are utilising some form of electronic computation in their designs, and because this implies the use of microprocessors and in general microprocessors now have communication capabilities, this means that almost all electrical devices in the home and workplace, domestic and commercial are becoming part of a communicating system in the premise.

Increasingly, in-home services are making use of these communicating devices and systems.

There are many sectors that already utilise standards and rules for their systems to work together, but in most cases such systems do not connect with systems in other sectors. In some sectors the level of interoperability is very limited.

The result is that an increasing number of devices and systems are becoming intelligent and communication ready. This can be put to use where, for instance:

- services such as energy management will need to access energy-using devices, to control them, thereby reducing costs and carbon emissions.
- telecare systems will need to access any device or sensor in the home to derive information about a person’s wellbeing
- particular systems may need to utilise other assets in order to provide intelligent and user friendly information to end users. (eg the link between a doorbell push button,

the chime in the home, the webcam watching the door and the TV that the home owner is watching so that this information can be displayed and the door answered to a welcome visitor.)

Each of the systems above requires the interworking and co-operation of devices that belong to previously independent sectors.

However, because systems and devices in one sector may well not have been designed to work in another, the consequences of a device working in another sector may not be predictable (in fact the actions of multiple systems, applications and devices working in unfamiliar environments can be highly unpredictable).

Interoperability will be very necessary in the digital home of the future

IF INTEROPERABILITY IS SO IMPORTANT WHY DON'T WE HAVE IT ALREADY?

There has been much work in various sectors. For instance in the PC to Entertainment sector the Digital Living Network Alliance has worked to specify a limited set of protocols that shall be used, the Appliance industry has set a protocol for domestic appliances to work together. There is similar work in Home Gateways (OSGi and HGI), in Security Systems and work is starting in Telecare.

The common factor of all this work is that it is almost entirely concerned with specific market sectors. There are no overall rules or framework to allow this and future work to interoperate across sectors.

ARE THERE SPECIAL PROBLEMS IN THE DIGITAL HOME?

Yes. There are multiple market sector areas and product types in the digital home that may need to work together. Some such as home control services (heating, lighting, environment) will be part of the infrastructure of the home. Some such as Telecare, Energy Management and Security will largely be fitted retrospectively and will be added to in an ad hoc manner and some such as entertainment and IT (PC Networks) and domestic appliances will be entirely ad hoc as people go out and purchase goods as and when they want or need them. The digital home will become a highly complex, unstructured network, communication and interworking environment and it will be difficult to ensure things actually do work together as expected and do not cause failures.

This is aggravated by the fact that without an ability to use management systems to view and apply solutions to home systems, there will be no way to ensure the reliable operation of the digital home.

WHAT ARE THE BENEFITS FOR INTEROPERABILITY IN THE DIGITAL HOME?

If there is interoperability across the digital home, then:

- Services to the home can share information and resources. Therefore, the cost of service provision is lower
- Smart Metering can provide information to energy using devices and displays collect information from them.
- Services such as telecare will be easier and cheaper to deploy and because all equipment can be interchangeable, then there will be fewer barriers to future and emerging technology
- If devices are interoperable the market becomes more competitive (and products less expensive)
- Management systems will be able to view the home systems and ensure that any problems are dealt with
- Competition will be enabled and allow multiple vendors to compete in the market

- The market will grow faster and contribute more to GDP

If Interoperability is not available, then:

- Sector based silos of interoperability will develop
- Resource sharing will prevent efficiency and sustainability
- Services may interfere with others in other sectors
- Nothing will be reliable and some services will not work in some environments
- People will not be able to buy new home systems and devices with confidence.

HOW URGENT IS THE NEED FOR AN INTEROPERABILITY SOLUTION?

Over the next few years existing and developing in sector solutions will come to fruition. Unless there is some form of solution to the problem of inter-sector systems and devices failing to co-exist, the provision of multiple systems in the digital home is likely to be faced by a barrier of unreliability. This has serious implications for health and telecare services and global and economic implications for energy management and sustainability.

If we are to move forward to a secure and reliable digital home with multiple services provided by multiple service providers, we need an Interoperability solution and we need to start work now.

WHAT CAN BE DONE?

It is almost certain that a new, overarching, complete solution is impossible, impractical and unnecessary. This is because there are already many systems and methods providing interoperability within market sectors or product types, and a system that demands these systems utilise a new interoperability solution is not likely to be acceptable. However, there are certain rules within an interoperability framework that will be acceptable across all sectors and provide ways forward for interoperability.

At the sector level there is work to be done that will allow both existing interoperability to be enhanced, and support new services. This would include possibilities for the elderly and disabled, as well as new energy management tools.

PROPOSED SOLUTION

TAHI proposes that an Interoperability Framework Standard be developed. This will set the requirements which will ensure Interoperability between systems that can then be used to deliver services and applications in the SmartHouse.

This work does not imply a new middleware approach or new systems (there are many tools already available), but it does require that rules are set that ensure that the tools available can be used across multiple sectors. It is recommended that an Interoperability Framework should be based on the TAHI Open Architecture (implemented in such EU Framework projects as TEAHA and now MonAMI). It can be developed into a set of “rules” that can be applied to any system that might be part of a greater interoperability system.

It is acknowledged that there are many of the components for an Interoperability Framework already in existence and that these components or tools must be utilised in the Framework.

WHAT NEEDS TO BE DONE

The work involved in delivering such a standard requires analysis of the requirements for new services to cut across multiple sectors, of the various methods employed in particular sectors, and solutions developed by research and other projects where such interoperability has been proven to be practical. Very little of what needs to be done is totally new.

There needs to be a full statement of the requirements of an Interoperability Framework which can then be turned into an International Standard.

TAHI is proposing that this needs to be a fast track solution and intends to use the methodology of a CENELEC Workshop Agreement (CWA) to create the standard. A CWA is a consensus method of standards development which is open to all stakeholders.

WHEN DOES THE WORK NEED TO BE DONE?

The work needs to start as soon as possible. Any delay means that more incompatible and conflicting systems are developed and the problem gets worse. We need to complete this work before mass deployment starts¹

- It is intended to launch the Initiative at the TAHI Forum on February 12th 2008
- It is intended that the CENELEC Workshop Agreement will have completed by the beginning of 2009 and that there will be an International Interoperability Framework Standard in place early in 2009.

Following on from this will be the task of promoting adoption of the standard, conformance and testing and certification. TAHI is proposing the following timeline:



WHO WILL DO THE WORK?

The work of preparing the standard will be carried out by experts in the area of interworking systems from industry and academia. They will work under the auspices of a CENELEC Workshop Agreement whose outcome will be an agreed Interoperability Framework Standard.

WHAT WILL THE WORK COST?

The basic cost of creating the standard will be around £100,000. However, much more work will need to be done to take the work forward, promote the IF and make sure it will be adopted and set in place measures for conformance and certification. It is likely that the total cost of this will approach £400,000 or more.

HOW WILL THE WORK BE PAID FOR?

It is proposed that the work will be sponsored:

- by TAHI Members with sponsorship packages of between £20k and £1k depending on their size
- and that UK Government (BERR) will contribute matched funding.

TAHI therefore proposes to launch an **Interoperability Framework Initiative** whose partners will be organisations that will contribute to the work and its cost. This Initiative will be launched at the TAHI Forum on 12th February 2008.

WHY IS TAHI PROPOSING THE INITIATIVE?

TAHI has been working in this converging area for 7 years and carried out a number of major trials, some market research and has been holding Industry Sector Working Group Meetings in the sectors that are closest to market growth. TAHI's experience and belief is that an

¹ One of the reasons that the Internet has been so successful is that the "rules" of how it worked were largely set in place before major roll out.



Interoperability Framework Solution is fundamental for the continued and speedy growth of the market for the services, products and equipment in the Digital Home. From its Interoperability Working Group TAHI believes it has the basis of an Interoperability Framework and hence believes that launching an Initiative is the best way forward.

TAHI Members already comprise a vastly knowledgeable and experienced core of organisations that will contribute to the Initiative. TAHI Members cover all the sectors that feed into the Digital Home and already understand the problems that not having Interoperability across sectors are and will cause.

WHO WILL THE PARTNERS BE?

It is anticipated that because this work is highly necessary and has been awaiting a high level initiative, that many of the stakeholders in services, networks, communication and devices in the Digital Home will be keen to be partners in the IF Initiative. TAHI is aiming to launch the Initiative with Launch Partners who are TAHI members whose membership subscriptions will support the initiative. It is expected that UK Government will be a Major contributor and it is hoped that EU Commission will also contribute. It is intended the IFI will be a pan European initiative and will be supported across Europe and Internationally.

HOW WILL THE WORK BE MANAGED?

TAHI will work with BSI to create a CENELEC Workshop Agreement under which there will be a project team (possibly drawn from TAHI Member organisations) that carries out the production of the proposed standard. BSI and TAHI will work to create a RoadMap for the project and with CENELEC to operate the requisite open forums to deliver consensus across Europe and potentially further afield. The details of this will be contained in the CWA Business Plan which will be created immediately the Initiative is launched and the funds are pledged for its work.

HOW WILL THE NEW STANDARD BE ESTABLISHED AND USED?

The TAHI sponsored Interoperability Framework Initiative is more than just a standards creation exercise. Throughout the process of developing the standard there will be work to ensure that the widest possible audience of Stakeholders is engaged in the consensus or the Standard. Once a Standard is in place there will be at least two years of effort to make sure that the standard is taken up by organisations in all the sectors operating in the Digital Home, there will be work on compliance, interoperability testing, conformance assessment and promotion of the work. It is intended that by 2012 there will be a well established network of test houses, support centres and a well established certification process.

AND WILL IT BE WORTH ALL THE EFFORT AND COST?

We are approaching a market that will provide services into perhaps a Billion homes worldwide.

- Delivering reliability for systems in the home will provide the consumer with confidence to buy new systems and services. (Could be worth £400 per year per home. (£400 Billion))
- The risk of the consumer (or service providers) attempting to fit rogue devices or systems and creating unreliability will be controllable via mainly autonomous management systems that could not exist without an Interoperability Framework Standard. (A management service could be worth \$10 per month per home (\$120 Billion))
- Healthcare systems will be able to ensure the environment of the patient at home is warm and comfortable as well as ensuring health and wellbeing – this will help to keep perhaps 5 percent of the people at home and out of expensive hospital and care home situations. (Could save governments and health providers £50 per week per person (£130 Billion per year))



- Energy companies will be able to provide optimum levels of comfort using less energy by providing new and innovative services.
For instance, Energy suppliers could supply 35% less energy to homes yet still retain the same level of profit because the clever comfort and environment systems would make up the margin loss from selling less energy and at the same time consumers would pay less².

A sensible and pragmatic Interoperability Framework Standard that is accepted and used by services and products and the home based user with certified systems and equipment is the key to unlocking the technical barriers to growth in this market.

The TAHI Interoperability Framework Initiative will work to ensure the uptake of the Standard and its implementation by all the stakeholders in the Digital Home and services to it.

SP 2008

² Energy cost savings 35% per home = Energy sales loss £250 pa. = margin loss by Electricity Retailer £25 per home
Price of service to Consumer £30 pa. with cost £5 per Home = margin gain to Energy Retailer £25 per home
Saving to consumer = £175 pa. Retailer profits stay the same.