

Interoperability

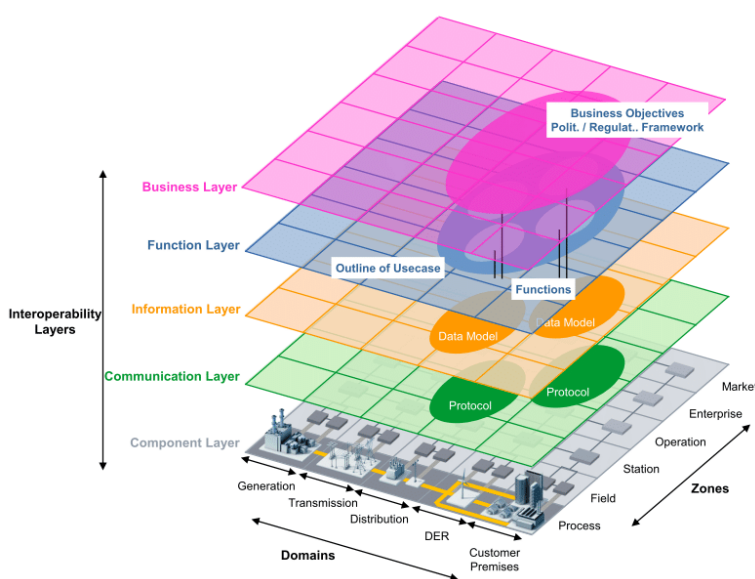
The **Efficient, Demand Flexible Networked Appliances (EDNA)** platform of the 4E TCP provides analysis and policy guidance to members and other governments aimed at improving the energy efficiency and demand flexibility of connected devices and networks.

This briefing summarises the key findings of the EDNA report on **Interoperability**. The efficiency of the electricity system can be greatly improved by smart and 'demand flexible' appliances. For example, the energy consumption of a building can be reduced if the equipment is controlled by sensors and smart algorithms. Demand flexible appliances can respond to variations in the supply of electricity from renewable energy sources or the electricity grid.

However, one of the key barriers to attaining these benefits is the interoperability of devices – their ability to communicate openly with other devices and third parties. The objective of the EDNA report is to gain a better understanding of the issue of device interoperability, and the resultant impact of this on intelligent efficiency and demand flexibility. The report proposes a definition for interoperability, analyses the causes and impacts of (a lack of) device interoperability and concludes with some policy guidance.

Observations for Policy Makers

- The EDNA report suggests that interoperability should be defined as *the capability of a product or system within the smart home landscape, to interact with other products or systems, by means of exchange of the necessary information and its common understanding, in order to maximise energy savings and to enable the electricity system to respond to upward or downward changes in the supply/demand balance in a cost-effective manner.*
- The Smart Grid Architecture Model depicts layers of interoperability in a smart grid system, including a business (cooperative) layer. Refer to the image on the right.
- If end-use devices (for example internet-of-things or 'IoT' devices) are not readily interoperable, it is difficult for them to be controlled by other devices and third parties, as is required for intelligent efficiency and demand flexibility.
- There is a wide consensus that *open* communications protocols (rather than *proprietary* protocols) are required to fully implement interoperability and derive energy benefits.
- Policies to encourage interoperability should focus on: support for open protocols and standardisation efforts, stimulation of market uptake, information to end-users, and encouragement of organisational interoperability (cooperation).



MORE INFORMATION

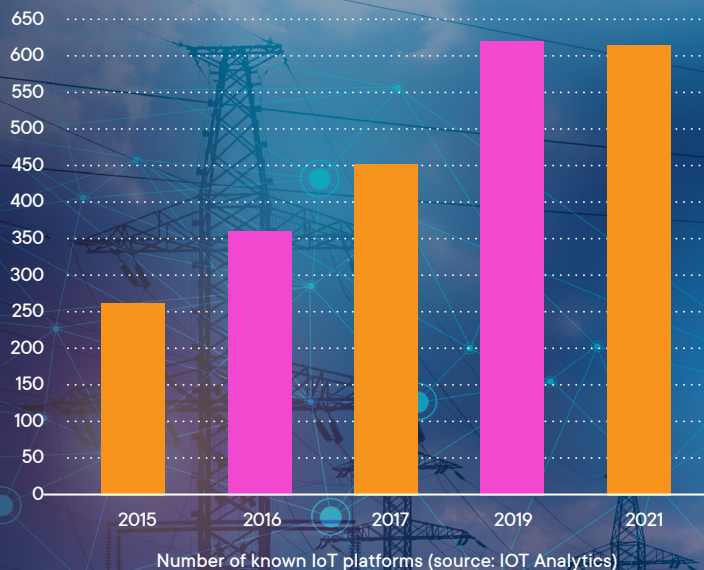
Published May 2024

The EDNA report and further information is available from the EDNA website and by contacting the EDNA operating agent at steve@beletich.com.au

Key Findings

Why interoperability is important

A lack of interoperability is currently leading to underutilisation of the energy benefits that smart devices offer – intelligent efficiency and demand flexibility. IoT represents a significant opportunity to implement these functionalities. However a large number of IoT platforms have now been launched – and with fragmented systems and multiple interfaces, users may not realise the full benefits that IoT offers.



Barriers to interoperability

Many smart devices are not interoperable, or not interoperable across different platforms. The majority of IoT platforms are closed ecosystems, and this leads to consumers facing the 'vendor lock-in' effect. They cannot freely select new hardware, but are required to purchase from the same manufacturer in order to enable interoperability within the product ecosystem. In addition, manufacturers often design IoT devices to use proprietary protocols that limit interoperability with other brands, in order to establish a market advantage. There is a 'winner take all' race between proprietary ecosystems to become the de facto standard for the entire market. Other reasons why manufacturers adopt proprietary protocols include cybersecurity and protecting intellectual property.

Efforts to address interoperability

The United States' ENERGY STAR® programme for efficient equipment includes voluntary criteria for 'connected' products. One of these criteria is that open standards shall be used for all communication layers. In addition, documentation shall be made available that allows access to certain functions of the product.

There are also other efforts towards more 'openness' where closed ecosystems are dominant. For example, the Z-Wave communications protocol was a closed protocol owned by Silicon Labs until 2020 when it became completely open. This was a strategic decision to not be left behind in the IoT market. Its inclusion in the Matter protocol (an open protocol) illustrates how large corporations can reconcile their closed systems with common and more open solutions, in order to expand their markets. In the words of Z-Wave Executive Director Mitch Klein, 'if this is successful, everyone sells more.'

One standardisation effort is the Smart Applications Reference Ontology (SAREF). This is a standardised ontology for IoT devices and solutions published by the European Telecommunications Standards Institute (ETSI). SAREF is conceived in a modular way to allow the definition of any device from pre-defined building blocks, based on the functions that the device performs. These building blocks allow separation and recombination of different parts of the ontology depending on specific needs.