CDA Design & Policy Principles for Energy Efficient Connected Devices
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Developed by the Connected Devices Alliance, these voluntary principles provide an energy efficiency blueprint for designers of products, protocols and policies in the field of networks and networked devices. They include:

- **Design Principles** to provide guidance on the key features of energy efficient connected devices, networks and related protocols - for designers, manufacturers and protocol authors.
- **Policy Principles** to encourage a common global framework for the development of government policies and measures.

The CDA encourages leading device manufacturers, trade associations and government agencies to support the CDA Voluntary Principles for Energy Efficient Connected Devices (see http://cda.iea-4e.org/cda-principles).

As the number of connected devices expands rapidly, these principles have been developed to ensure that the high standards achieved for energy efficiency through technology advances continue in the new age of increased connectivity.

CDA DESIGN PRINCIPLES FOR ENERGY EFFICIENT CONNECTED DEVICES

1. Networked device design should follow standards-based communication and power management protocols to ensure compatibility and interoperability, and should take advantage of standards and protocols that actively support energy efficiency.
2. Networked devices should not impede the efficient operation of a network (for example by injecting bottlenecks or faults, or impeding power management activities in other devices).
3. Network-wide energy efficiency optimization should be a key development consideration. Network power management should coordinate with individual device power management techniques to achieve this.
4. Connection to a network should not impede a device from implementing its internal power management activities.
5. Networks should be designed such that legacy or incompatible devices do not prevent other networked devices on the network from effective power management activities.
6. Networks and networked devices should have the ability to scale power levels in response to the amount of the service (level of functionality) required by the system.
7. Edge devices without networking functionality should enter network standby, if not inappropriate[a], after a reasonable period of time when not being used. Edge devices with networking functionality should provide power management capabilities for each function consistent with that function's role in the network[b].
8. Networking and networked infrastructure devices should, when work load allows, autonomously minimise power consumption.
9. Consumers should be informed about, and have control over, device power management, including any impacts on the energy consumption of the devise and of any dependent devices, and changes to the user experience.
10. The design and operation of networked devices should be compatible with, and promote the positive effects of, using consumer electronics and information and communication technology (ICT) to enable energy to be used more efficiently, often referred to as "Intelligent Efficiency."

[a] Edge devices whose role is to complete a task, conduct no other service and can tolerate an extended resume sequence, should autonomously go into network standby.

[b] Power management consistent with its role in the network: e.g. an edge device with networking functionality such as a printer with an integrated access point controller may put edge device functionality (printer) into a network standby state while maintaining operation of networking functionality (access point).

CDA POLICY PRINCIPLES FOR ENERGY EFFICIENT CONNECTED DEVICES

1. Government and industry should seek harmonized policy approaches that benefit the global marketplace for consumer and commercial technology products and services, and that enhance the productivity and efficiencies achieved via networks.
2. Policy, including government procurement and best-practice sharing, should support continued device, network and intelligent efficiency innovation.
3. Energy efficiency requirements should be technology neutral. Policy should account for the different capabilities and performance of networked devices.
4. Policy should neither impede the functionality of networked devices or efficiency of the network nor impair device or network security.

To show your support for the CDA Principles visit: **http://cda.iea-4e.org/cda-principles**

Further information is available from: **http://www.iea-4e.org/projects/g20**

DEFINITIONS

- Device Power management: The capability of a device to adapt its power to the required functionality. Examples of device power management are power scaling, and transitioning into a low(er) power operating mode.
- Edge device: An end-user device that is connected to a network. Edge devices range from electronic devices such as smart TVs to appliances, heating, cooking and lighting equipment.
- Latency: The time it takes for a device or part thereof to change state or mode so that it can respond to a request or to provide a requested function.
- Network or Network System: A digital communication infrastructure with a topology of links, an architecture, including the physical components (devices), organizational principles, communication procedures and formats (protocols). Networks can interconnect with other networks and contain sub-networks.
- Network power management: The capability of a community of networked devices to manage power optimally across the community. Examples of network power management include consolidation of resources, managing the state of network links, and proxying.
- Networked infrastructure device: A device connected to a network that is shared by more than one edge device (client). A server would be an example of such a device.
- Networked devices: A general term meant to cover all devices that are connected to networks and make up the network. Edge devices, networked infrastructure devices, and networking devices are all subsets of networked devices.
- Network idle: The inactive status of a network (link) which a device is connected to (i.e. is not processing a "pay load"). Under this condition, the device(s) connected may still be required to support various functions to support its network connection and operation.
- Network standby: A low power mode in which a device has the capability to maintain a persistent network presence after its operation has been suspended.
- Networking Device: A device connected to a network whose main functions are to optimise and facilitate effective data transfer between network-connected devices. A WiFi access point would be an example of such a device.
- Networking functionality: The functionality to pass along data traffic and routing data between networked devices. For networking devices, the networking functionality is the main function. For edge devices, the networking functionality may be one of the (secondary) functions, e.g. a network printer with an integrated wireless access point.
- Power scaling: The capacity of a device to dynamically change its power level in relation to its variable workload; it may involve voltage and/or frequency scaling.
- Standards and protocols: Widely-accepted technical documents which specify how networked devices communicate or manage energy consumption. Published by standardization organizations or recognized standards developing organizations / alliances. Does not refer to regulatory standards.