ETSI ES 203 237 V1.1.1 (2014-03)

Environmental Engineering (EE);
Green Abstraction Layer (GAL);
Power management capabilities of the future energy telecommunication fixed network nodes

Reference
DES/EE-0030

Keywords
energy efficiency, network monitoring

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Contents

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://ipr.etsi.org).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Environmental Engineering (EE).

Introduction

Energy efficiency has become one of the most important aspects for both today's and tomorrow's telecommunications infrastructures. The Green Abstraction Layer (GAL) is an architectural interface/middleware that will give flexible access to the power management capabilities of future energy-aware telecommunication fixed network nodes. The present document defines the GAL design interface with the purpose of effectively exploiting the capability of adapting the energy consumption of the network nodes with respect to the load variations.

The main objective is to standardize the interface between the network control processes specifically designed for energy efficiency purposes and the power modulation capabilities of network devices. In particular, the GAL considers three principal aspects:

- making explicit the trade-off between energy consumption and network performance;
- mapping the power consumption of the hardware blocks with virtual and logical network resources;
- hiding the details and complexity of internal power modulation mechanisms.

In this respect, the GAL is composed of two main parts: the Green Standard Interface (GSI) and the Energy Aware States (EASes). The GSI exchanges power management data among data-plane elements and processes realizing control plane strategies in a simplified way. Instead, the EASes describe the different configurations and corresponding performance with respect to the energy consumption of the devices.

The GAL standardization process in ETSI represents a good example of collaboration between ETSI and a European Research Project, because the ideas and the structure of the GAL have been developed in the EU ECONET project [i.1], which is still directly supporting the standardization process in ETSI.

1 Scope

The present document describes the Green Abstraction Layer (GAL), which defines a novel way for managing and monitoring energy and performance profiles of device hardware.

The GAL is an interface between data and control planes for exchanging data regarding the power status of a device. This interface if specifically conceived to hide the implementation details of energy-saving approaches, as well to provide methodologies for interactions between heterogeneous "green" capabilities and Hardware (HW) technologies, on one hand, and control and monitoring frameworks, on the other hand. With "green" capabilities, we refer to any type of mechanisms that implement appropriate optimization policies aimed at reducing the power consumption of a resource. Indeed, this interface provides flexible access to the power management capabilities of the future energy aware telecommunication fixed network nodes to effectively adapt the energy consumption of the network nodes with respect to the load variations.

By means of the GAL, control applications will be allowed to get information on how many power management settings are available at the data-plane, and on the potential effect of using such settings. The other way round, control applications will be capable of setting a certain power management configuration to the device data-plane. It is worth nothing that, in order to provide the information needed by control applications to reduce the energy consumption while meeting the Quality of Service (QoS) constraints, the GAL explicitly represents the impact on network performance when different power management settings are applied.

The main objective of the GAL is to standardize the interface between the Network Control Policies (NCPs, for the energy efficiency purpose) and the power modulation capabilities of network devices.
There are three key aspects that have to be addressed by the GAL:

a) to make explicit the trade-off between consumption and network performance;

b) to map the consumption of hardware blocks with virtual/logical network resources; and

c) to hide the details/complexity of internal power modulation mechanisms.

In this respect, the present document contains:

- the definition of the GAL general architecture;
- the definition of the interoperable interface (GSI) between the energy-aware control processes (NCPs and LCPs - Local Control Policies) and the power management capabilities of the fixed network devices;
- the definition of the EASes describing the different configurations and corresponding performance with respect to the energy consumption of the devices.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

[1] ETSI ES 202 336-1: "Environmental Engineering (EE); Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks); Part 1: Generic Interface".