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CHANGE, E-WASTE, ENERGY EFFICIENCY;
CONSTRUCTION, INSTALLATION AND PROTECTION
OF CABLES AND OTHER ELEMENTS OF OUTSIDE
PLANT

Energy control for the software-defined networking architecture

Recommendation ITU-T L.1360



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Energy control for the software-defined networking architecture

Summary

Energy efficiency has become one of the most important aspects for both current and future telecommunications infrastructures. Taking energy into account induces a new constraint when managing a network. To tackle the integration of the energy constraint into the networks, the European Telecommunications Standards Institute (ETSI) has recently standardized the green abstraction layer (ETSI ES 203 237) which is an interface between the resource and the control planes of a network that enables control plane processes to manage the power management capabilities of fixed network nodes to effectively adapt the energy consumption of the network nodes with respect to the load variations.

Recommendation ITU-T L.1360 defines the integration of the green abstraction layer into a software-defined networking (SDN) architecture (see Recommendation ITU-T Y.3302) in which the connections between a set of network resources are on demand and are managed by one or more software-defined networking controllers.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
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FOREWORD

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Recommendation ITU-T L.1360

Energy control for the software-defined networking architecture

1 Scope

This Recommendation defines the integration of green abstraction layer [ETSI ES 203 237] into a software-defined networking (SDN) architecture [ITU-T Y.3302].

Four basic SDN elements are defined within the SDN architecture [ITU-T Y.3302]: the SDN application layer, the SDN control layer, the northbound interface between the SDN application layer and the SDN control layer and the southbound interface between the SDN control layer and the SDN resource layer. The green abstraction layer adds a further dimension which requires integration and is the subject of this Recommendation.

Since the green abstraction layer allows applications to access to the power management capabilities of network nodes in the resource layer to effectively adapt the energy consumption of the network nodes with respect to the load variations, it can be said that all the SDN elements are impacted.

In this respect, this Recommendation focuses on:

- The definition of an energy-efficient SDN general architecture;
- The definition of an energy states model.

Appendix I provides an example of an energy-efficient SDN based on the Open Networking Foundation (ONF) specification [b-ONF-SDN].

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T Y.3302] Recommendation ITU-T Y.3302 (2017), *Functional architecture of software-defined networking*.

[ETSI ES 203 237] ETSI ES 203 237 (2014), *Environmental Engineering (EE); Green Abstraction Layer (GAL); Power management capabilities of the future energy telecommunication fixed network nodes*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 convergence layer interface [ETSI ES 203 237]: GAL interface designed to map the GAL commands and data into low-level configuration registers/APIs, which are often manufacturer/HW specific.

3.1.2 energy-aware entity [ETSI ES 203 237]: Entity that can trade its power consumption and its available functionalities and responsiveness.