

Virtual Routing Function Allocation Method for Minimizing Total Network Power Consumption

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Abstract : In a conventional network, most network devices, such as routers, are dedicated devices that do not have much variation in capacity. In recent years, a new concept of network functions virtualisation (NFV) has come into use. The intention is to implement a variety of network functions with software on general-purpose servers and this allows the network operator to select their capacities and locations without any constraints. This paper focuses on the allocation of NFV-based routing functions which are one of critical network functions, and presents the virtual routing function allocation algorithm that minimizes the total power consumption. In addition, this study presents the useful allocation policy of virtual routing functions, based on an evaluation with a ladder-shaped network model. This policy takes the ratio of the power consumption of a routing function to that of a circuit and traffic distribution between areas into consideration. Furthermore, the present paper shows that there are cases where the use of NFV-based routing functions makes it possible to reduce the total power consumption dramatically, in comparison to a conventional network, in which it is not economically viable to distribute small-capacity routing functions.

Keywords : NFV, resource allocation, virtual routing function, minimum power consumption

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