

Virtual Networks A Flexible Platform for Network Services

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Virtualization is a technique that has been used in computing to abstract hardware and software resources for the purpose of simplifying their management. With virtualization, resources such as files, memory, storage and applications can be easily controlled, manipulated and monitored. By abstracting resources the physical details are hidden and handled automatically through a layer of virtualization software.

We present a network virtualization technology that abstracts networks as virtual domains, where network elements are identified with virtual domain names rather than physical IP addresses and network segments are identified with virtual sub-domains rather than IP subnets. A virtual domain can represent a coherent functional group of users and their computing resources, liberating them from dependence on physical network locations and parameters.

A hosting server facilitates the operation of virtual networks. Member computers of a virtual network communicate with each other through virtual network drivers installed in each computer and by coordinating with the hosting server. Policies are defined for each virtual network, on the hosting server, to facilitate and enforce a specific network service. Policies are distributed to member computers, when they join the service, and are enforced by member computers. The result is a highly manageable platform for a variety of network services such as security, mobility, and specific networked applications like IP voice and video telephony, collaborative communications and interactive gaming.

Secure virtual domains will be presented as a specific case of policy-based virtual networks to illustrate how secure communication services for the extended enterprise can be supported with unprecedented level of ease inside the enterprise, across the boundary of the enterprise and outside the enterprise as well as across multiple enterprises with one unified solution.