

Definition and Perspective of Virtual Networks

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Key properties of VN

- Partitioning: each resource can be used concurrently by multiple VN instances
 - Isolation: the clear isolation of any VN from all others
 - Abstraction: in which a given virtual resource need not directly correspond to its component resources
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- Aggregation: aggregate multiple instances to obtain increased capabilities

What is VN?

- Virtual network is a network of physical or logical partitions of network resources and is separated from other virtual networks. Virtual network can expand its capabilities by aggregating multiple physical or logical resources.
- Logical resource has the same mechanism as physical resource and can inherit all existing mechanisms and tools for physical resource.
[Based on draft-ietf-l3vpn-vpn-vr-03]

Key components for VN

- The key components of VNs include traditional network resources, such as hosts, routers, switches, links, etc
 - Logical resources
- Additional components: methods for creating and managing the VNs

What are VNs used for?

- Same purposes as non-virtualized networks without interfering the operation of other virtual networks while sharing the key components among virtual networks
 - Coexistence of multiple VNs
 - Different VNs may use different network technologies without interference
 - Increase utilization
 - Can provide normalized set of interfaces and make it easier to provision VNs
 - Can support seamless migration/update of VNs

Key challenges

- Performance: how to reduce the performance degradation
- Scalability: how many VNs can be simultaneously exist?
how many key components can be connected?
- Isolation: isolation among the VNs
 - Security isolation, performance isolation, etc.
- Management: how to provide independent management functions for each VN
- Flexibility: update of VN's capability needs to be done dynamically and without interrupting the operation of the current VN
- Abstraction

Open issues

- Network virtualization vs. Virtual network
- ML discussion
 - Federation of multiple VNs
 - Programmability