# WAN Virtualization

## Introduction

//What is it

WAN Virtualization is an intelligent software layer that sits between the physical WAN resources of a business. It is intelligent because it monitors and measures all the links and paths available, and makes routing, re-routing, and load balancing decisions in real time based on the current state of the network. It also has the ability to offer Quality of Service (QoS), meaning it can segregate network traffic based on QoS policy. This can greatly improve the performance of video streaming, VOIP, and other high bandwidth services.

WAN Virtualization software can be monitored centrally so the network manager can be kept up to date in real time about the whole state of the network. If a link goes down, or there are significant quality distortions, the network can be rerouted almost instantaneously so that the end user does not notice the disruption of service. This includes issues related to network congestion.

A good WAN Virtualization implementation allows all available bandwidth to be used both when the network is quiet and congested. Application traffic can be moved from one connection to another in real time if the state of the network changes. This is important as it ensures maximum bandwidth utilization and predictable application performance.

Hardware is required to be installed and set up at every business location.

**Why it will suit our business**

Our company’s primary interconnectivity is via service provider connections (MPLS VPN). We also have a mix of local internet connections and dedicated back door links (e.g. dark fibre). Having multiple connections across multiple sites under our companies’ WAN makes it very difficult to monitor performance and quality of service. WAN virtualization performs “bandwidth aggregation”. This means that all links can be used almost all the time, and if a link fails another can take its place almost instantly. It also uses “loss-mitigation” which minimises the impact of packet loss, latency, and jitter. This suits our business because all of our current links can be aggregated together. This means that we do not have to change any existing contracts to our ISP’s. It also means that if we decided to add more connections with future expansion of our business, we can simply aggregate the new connections without changing the existing connections. WAN virtualization will figure out how to best distribute the network load with the new topology.

WAN Virtualization give our business full control over how we want our network to run. We can see in real time the current network load, what routes are being used, and what segments of our network have the most traffic. We can apply policy to our routes so that certain packets have priority in the areas that need them. For example, we can give high priority to VOIP packets in our call center, but make those packets low priority for our servers network. In this way we can ensure that our network is running as optimally as possible. We could also save money by choosing to use the network links from ISP’s that have cheaper bandwidth.

## MPLS vs WAN Virtualization

Multiprotocol Label Switching (MPLS) consists of multiple sites each with a Customer Edge (CE) device installed, that connects to a provider core network with a Provider Edge (PE) device installed. The provider must run a dedicated line to each of the sites, which can often take some time (depending on the provider). The provider must also configure EIGRP or BGP between the PE and multiple CE’s. This takes some control from your network administrator. MPLS is an expensive option to implement, and the enterprise customer must also consider these potential problems:

* Managed services are required, even if not needed.
* Control of traffic flow using multiple providers can be problematic.
* Changing providers requires coordination of switch over to prevent route loops.

WAN Virtualization can be viewed as a virtual extension of the network and transparently extend the infrastructure over a provider’s network. A few of the advantages this provides includes:

* This can be implemented without provider input. I.e. The WAN is completely under your control.
* Supports both IPv4 and IPv6
* No limitations on number of routes exchanged between sites.
* Network convergence is not dependent on the service provider.
* Can be implement through both managed and non-managed internet connections.

As we have an existing MPLS connection, we do not have to get rid of this if we decided to implement WAN Virtualization. In fact it can be aggregated along with our other existing connections.

## Summary

WAN Virtualization has many benefits as described above. After thoroughly researching the technology I feel it would be of great benefit to our business if we decide to implement it. Our existing network WAN is difficult to manage stretched across multiple sites and multiple ISP providers. We are occasionally at the mercy of our ISP when we need MPLS changes. These changes can often take a long time to implement and require precise coordination between ISP and our network technicians, in order to avoid significant down time which affects our employees and customers.

There is an ongoing cost associated with running this system. In most cases we must lease this technology from the manufacturer. There is also a cost to set up and install the hardware across all out our WAN sites

## Products Available

//List Current WAN Virtualization products on the market

NetScaler SD-WAN – Citrix

Riverbed WAN

## Recommended Solution

//The best solution for our business and its cost.

## References

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