NetAbstraction

A Network Privacy as a Service – The Future of Protected Enterprise Networks

Key Differentiators vs. NSX

EXECUTIVE SUMMARY

Public cloud computing has rendered traditional enterprise wide area networks (WANs) suboptimal, from a price, performance, and security perspective. Software Defined Wide Area Networks (SD-WAN) have revolutionized how enterprises manage their wide area networks. However, SD-WANs significantly increase the enterprise's public exposure and therefore its cyber profile, rendering traditional security methods inadequate. NetAbstraction provides the protection lacking in the traditional SD-WAN and is the next generation of wide area networking. NetAbstraction provides a simple but very effective solution that obfuscates and anonomizes traffic enabling private browsing and private application to cloud connections.

SD-WAN technology enables customers to measure quality, steer traffic, and remediate impairments across multiple network pathways. The benefits to an SD-WAN approach are substantial, including simplified management and operations, reduced costs, and increased visibility and potentially increased security. Adopters of SD-WAN are experiencing 30 to 40 percent savings in their WAN network infrastructure costs. NetAbstraction can reduce these costs even further and will greatly enhance network protection.

While SD-WAN has made the enterprise's use of their WAN more efficient, it has not solved some of the fundamental issues in today's WAN. Leased lines are static and make a fixed target for cyber attack. They also limit the ability to elastically meet bandwidth demands. In addition, they are expensive. MPLS services are also costly, complicated and largely inflexible resulting in a fixed target. When considering the use of the Internet or cloud, there are significant cost savings, but performance and security are key considerations. NetAbstraction's next generation networking service makes the Internet the preferred solution – NetAbstraction is cheaper, faster, more secure, more resilient, and more flexible.

WAN traffic is continuing to grow over 200 percent on a yearly basis. At the same time, MPLS bandwidth pricing, unlike decreasing cloud pricing, has remained fairly constant, further supporting the shift to SD-WANs. Purchasing lower cost bandwidth is a great way to handle the rise in overall WAN traffic without breaking the bank."

Network leaders must continue to evolve their WAN, driven by the enterprises' needs for digital business transformation, the increasing use of as-a-service models and the increased adoption of real-time applications across the WAN. This is creating a need to incorporate the Internet as an intrinsic part of the enterprise WAN in concert with more traditional (e.g. MPLS) services. Gartner predicts a rapid adoption of Internet services for enterprise connectivity needs. They anticipate that by 2020, more than 60% of enterprises will have deployed direct Internet access, up from less than 30% in 2016.

NetAbstraction's extensive expertise is rooted within the Intellgence Community. Our backgrounds are in: offensive and defensive cyber; protection of user identities; and innovative engineering, implementing networks to support clandestine communications. Building from a deep understanding of the current state-of-the-art technologies, we innovate and provide the next generation of privacy, identity protection, and security capabilities.

We understand, first hand, the challenges our customers face when meeting today's cyber and privacy needs.

MARKET TRENDS/ASSUMPTIONS:

- 30-50% of large enterprise traffic is shifting to the Cloud, changing traffic flows and making traditional WAN suboptimal.
- 80% of new applications will be deployed in the Cloud by 2030.
- 20% increase in enterprise WAN bandwidth per year at the branch. Network traffic is doubling every three years.
- By 2022, 30% of enterprises will remove some digital business services from the visible public internet, up from less than 1% in 2017.

- By 2023, 60% of enterprises will phase out traditional VPNs for digital business communications in favor of software-defined perimeters, up from less than 1% in 2017.
- Through 2021, organizations that isolate and remove digital business services from direct public internet access will experience 70% fewer successful attacks than organizations that didn't adopt isolation.
- Enterprises currently spend more than $100 billion per year on WAN infrastructure.
- 82% of Fortune 100 companies have adopted NSX.

NETABSTRACTION

NetAbstraction is a carrier class Network Privacy As A Service that protects your identity and provides additional security for your communications on the Internet. NetAbstraction's patented design obscures and varies network pathways while protecting customer identities and systems via implementation of Software Defined Network (SDN) virtualization across multiple cloud providers. NetAbstraction provides secure, varied, and non-apparent network connectivity, a range of identity management and persona attribution options to alter or reduce the cyber attack profile, and system designs to help control customer information held within commercial cloud provider databases. In addition, NetAbstraction augments the multi-layered security capabilities provided by the commercial cloud providers, to include implementing dynamic security policies to help ensure that malicious traffic is not allowed to enter the network.

Cloud infrastructure is acquired using identity management domain expertise that the NetAbstraction leadership gained through our background in the Intelligence Community. We are cloud agnostic and always implement our network communications pathways across at least two different cloud provider networks.

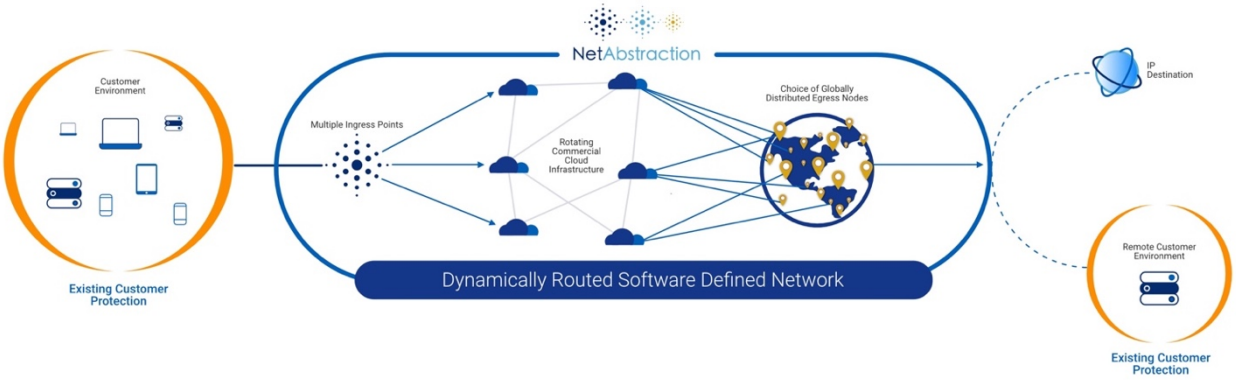
We add an additional layer of virtualization in the acquired infrastructure using containers. We then deploy the components of our SDN software to create the Software Defined Network Layer 2 overlay across the commercial providers' Layer 3 fabric.We automate the tunneling and provisioning of the network to dynamically shift and adjust communications pathways on the fly, in real-time, without impacting our customer's communications.

Our patented ability to control the network routing protects our customers' identities and locations, enhances performance, and creates isolated channels of communications.

In order to efficiently manage the complexity of establishing and maintaining the network supporting the NetAbstraction service, we have chosen to use a commercial software product, Nicira Network Virtualization Platform (currently renamed NSX with its purchase by VMWare). NSX is a distributed software suite that creates scalable, fully featured, isolated virtual networks that are completely decoupled and independent from the physical network. The NSX product is predominantly used in data centers to address the barriers of scaling network infrastructure in order to keep pace with the rapid expansion of cloud technology. While it is a non-traditional use, the NetAbstraction service has taken advantage of and adapted most of the features of the standard NSX product to our architecture. Our service has been designed to establish a logical Layer 2 SDN network across the commercial provider's Layer 3 network.

NetAbstraction's patented capabilities address fundamental deficiencies inherent in most SDN implementations thus delivering improved performance, increased security, and better agility. NetAbstraction provides significantly increased resiliency and a dramatically reduced cyber attack vector. NetAbstraction provides the opportunity for enterprises to leverage the Internet for most, if not all of their WAN requirements.

NetAbstraction Overview



KEY DIFFERENTIATORS ABOVE AND BEYOND NSX:

NetAbstraction is a software-based managed service offering. NetAbstraction takes the complexity and cost out of setup, maintenance and operation. NetAbstraction offers a software-based solution and zero-touch deployment. With NetAbstraction, no costly network reconfigurations, hardware purchases or burdensome onsite maintenance is required. It is not clear how VMware intends to support this offering.

NetAbstraction provides Network Privacy As A Service, which is a key and very important differentiator. Gartner has validated that Privacy is becoming an important part of the overall security strategy. NetAbstraction secures network connections and disguises the overall network topology. This makes it extremely difficult for adversaries to conduct reconnaissance and targeting on customer networks. NetAbstraction effectively lowers your organization's cyber profile so that bad actors can't target you or attack you. Privacy is not marketed as a core tenet of the VeloCloud NSX SD-WAN offering. There is no indication that an effort is being made to obfuscate network connections or customer identities.

NetAbstraction is implemented in and across multiple clouds including AWS, Azure, GTT/Interoute, IBM cloud and others. Moreover, the NetAbstraction design enables seamless deployment of data, applications, and services across all clouds.

NetAbstraction provides end-to-end encryption of the network. VeloCloud has encryption on several portions of the network, but not end-to-end. Most SDN implementations, including VeloCloud NSX SD-WAN, require decryption at each intermediary node. NetAbstraction has the ability to establish VPN tunnels without the need to broadcast the identity of participating nodes provide end-to-end encryption across the network.

NetAbstraction's patented ability to control the routing through the network reduces overall network latency and improves performance. Because we control the routing through our network, NetAbstraction has the ability to provide truly carrier grade performance. We are only throttled by limitations of the commercial cloud providers themselves. This allows customers access to the full capabilities of the Internet, streaming video, social media content, as well as all the features of any applications they are using. Most SDN implementations must tear down and re-establish a virtual connection and thus have too much latency to keep the communications connections up and running when changing the network communications path. Velocloud establishes static, pre-defined connections within the SD-WAN that rely on traffic monitoring to choose the "best" path. In addition to performance benefits, NetAbstraction's patented ability to control network routing also has tremendous benefit to organization's GDPR compliance efforts. NetAbstraction's ability to control routing through the network enables organizations to meet **GDPR data governance requirements** by providing complete insight, access and control over network pathways and data. NetAbstraction's global network enables customers to control network routing on a worldwide basis. It is unclear whether VeloCloud provides network routing capabilities that can provide such control over data and communications pathways. If this capability is not present in VeloCloud's offering it would seriously impact opportunity in EU markets.

NetAbstraction dynamically shifts the network. VeloCloud talks about dynamically shifting, but that is across network links. NetAbstraction's ability to dynamically shift network pathways, on the fly, in real-time, without interrupting or degrading customer communications is a unique capability. Most SDN implementations must tear down and re-establish a virtual connection and thus have too much latency to keep the communications connections up and running when changing the network communications path. Most other providers establish static, pre-defined connections within the SD-WAN that rely on traffic monitoring to choose the "best" path, whereas NetAbstraction can dynamically establish these connections based on a near infinite number of conditions. We are also able to establish new network nodes and paths on the fly through our network, including deployment of new customer applications and payloads.

NetAbstraction provides identity management expertise and acquisition support to dramatically reduce soft-target attack vectors in the billing trail. NetAbstraction provides value-added identity management expertise gained from decades of experience in the Intelligence Community and Federal Government. We understand the threats, targets and methodology adversaries use to exploit the enterprise. VeloCloud does not offer any identity management services nor do they market any capability to obfuscate user/customer identities while utilizing VeloCloud NSX SD-WAN.

NetAbstraction prevents insider threat issues within commercial provider infrastructure and services through the use of surrogate identities unaffiliated with the end customer and NetAbstraction. VeloCloud NSX SD-WAN does not provide identity management services to obscure customer identities within their network or across provider networks.

NetAbstraction has implemented it's network with enhanced strategies to protect against cyber threats. NetAbstraction leverages all the security features of traditional SDN technology and the commercial providers, and enhances them through our patented

implementation. Some specific benefits provided by the NetAbstraction network implementation:

- We disguise your network communications pathways – if they can't find you, they can't target you!
- We protect your identity by providing alternate subscriber information, which is typically exposed in commercial providers' databases.
- We use multiple providers/technologies and geographic locations to disperse and layer any points of possible attack.
- We regularly rotate and exchange the infrastructure and subscribing identities that we use to establish our physical infrastructure.
- We dynamically shift your network – it is hard to identify or hit a moving target. We shift our customers' communications pathways on a regular basis or dynamically in response to a perceived cyber threat, without interrupting or degrading customer communications.
- We logically isolate each customer's communications on top of our physical infrastructure, hiding the customer network topology from any external scrutiny and insuring customer data is segregated and not exposed to others.
- By creating a virtualized network, we decouple the logical network from the commercial provider's physical network. The logical decoupling of virtual servers from the physical network reduces the opportunity for attackers to reach resources connected to the network. It also isolates the logical network from vulnerabilities inherent in the physical network infrastructure. We work at the core layer 2 and 3 of the technical infrastructure; most SD-WAN implementations work at the Layers 4, 5, and 6. As a result we can support a wider range of activities with less performance impact.

ABOUT US

NetAbstraction™

NetAbstraction, Inc. is an Internet and cyber security firm that offers services that lower your organization's systems "visibility" as a target on the Internet. Our management comes from backgrounds working for the federal government, enabling capabilities to support several Intelligence Community missions.

With substantial experience in offensive cyber operations and in designing, creating, and implementing non-traditional, non-attributable, telecommunications networks, we have a deep understanding of the current state of the art technologies. We are innovating and providing the next generation of privacy and identity protection capabilities while understanding, first hand, the challenges our customers face when meeting today's cyber and privacy needs.

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