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SD-WAN

Five Ways SD-WAN Is Transforming Cloud Connectivity

Meet enterprise requirements for connecting to the cloud.

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INTRODUCTION

SD-WANs are agile, cost effective, and reliable—providing all the benefits of MPLS and internet networks with none of their liabilities.

The internet has fueled countless technological advancements, and presented organizations with incredible opportunities to expand geographically reaching more customers and enabling greater employee productivity and collaboration.

As an organization becomes more successful and network usage increases, the WAN struggles to keep up with demands from users and bandwidth hungry applications. Inevitably, applications become slow and unreliable, causing frustration and agitation to both the business and their customers.

Pursuing and gaining the maximum advantage out of wide-area networks (WANs) has become a business imperative. As cloud-hosted applications have raised the stakes for edge network performance, enterprises now require even greater reliability, agility, and performance from their WAN to leverage the cloud's economies of scale. This trend has spurred networking technologies like SD-WAN that are making transformational changes in the way enterprises deploy next-generation WAN architecture.

This white paper reveals five ways Oracle SD-WAN can transform your edge network connectivity to the cloud to meet all your enterprise requirements. Instead of a WAN that limits expansion, the Oracle SD-WAN family of products empowers your business to accomplish more than you ever expected.

THE BUSINESS IMPERATIVE

To gain competitive advantage, companies with cloud-hosted applications and distributed workforces are turning to SD-WANs to achieve CapEx and OpEx savings, reduce complexity, and ensure connectivity is reliable, flexible, and secure. According to IDC's Worldwide SD-WAN Forecast 2017–2021, SD-WAN deployments will reach US$1.19 billion this year, as enterprises take advantage of its benefits in handling cloud, mobile, big data, and IoT traffic.

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Companies must respond quickly to time-sensitive, regional business opportunities. So getting a new WAN up and running quickly, cost efficiently, and with consistent connectivity can be crucial. While the traditional enterprise implementation of multiprotocol label switching (MPLS) provides a consistent, reliable network, it falls short in cost efficiency and agility as deployment can take months. On the other hand, broadband internet is cost efficient and can be deployed quickly, but it falls short when it comes to reliability, performance, and security. Fortunately, the SD-WAN provides the benefits of MPLS and internet while overcoming their limitations. Oracle SD-WAN, in particular, can help you transform your network in five critical ways.

TRANSFORMATION #1

Freedom of Network Design

SD-WANs combine multiple link types into a single, unified pool of bandwidth available to all applications. Creating a virtual network overlay, Oracle SD-WAN takes advantage of all available WAN connections while centralizing control and providing visibility into the entire SD-WAN. Oracle SD-WAN decouples network configuration from individual WAN links and hardware components, creating a software-driven, unified WAN fabric.

This delivers the WAN equivalent of a poker player's royal flush, an undeniable winning combination built upon:

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- **Bandwidth of choice:** Become less reliant upon MPLS and associated legacy equipment by incorporating flexible alternatives such as commodity internet and long-term evolution (LTE) links.
- **Better SLA attainment:** SD-WAN closes the accountability gap within service provider service-level agreements (SLAs), giving you more sustainable operations and independence to negotiate. Because Oracle SD-WAN monitors all traffic on all paths on a packet-by-packet basis, all traffic remains compliant to SLAs defined within Quality of Service (QoS), even when WAN conditions begin to degrade across paths.
- **Flexibility:** SD-WAN matches current network resources to WAN traffic demand, whether you're using it as an overlay in a hybrid, all-MPLS WAN or an all-Internet WAN.
- **Scalable and easy service-chaining:** A service chain consists of a set of network services—such as WAN optimization, firewalls, network address translation (NAT), routers, and virtual private network (VPN) concentrators—that are interconnected through the network to support an application. In the past, building a service chain to support a new application took a great deal of time and effort, since it meant acquiring specialized, individually configured network devices and connecting them together in the required services sequence. Oracle SD-WAN orchestration makes service-chaining and application provisioning significantly faster and easier.

Oracle SD-WAN creates a cohesive and efficient collection of all physical links and interfaces, and aggregates them into a single, logical interface to create a virtual WAN conduit. The WAN conduit takes advantage of real-time intelligence encapsulated in the header of every packet the SD-WAN processes. It also supports 128b or 256b advanced encryption standard (AES) across all aggregated

WAN paths. All WAN paths are managed unidirectionally so that every packet reliably reaches its destination.

TRANSFORMATION #2

Dynamic Path Liquidity

Cloud applications aren't homogenous. On the internet, all applications compete for the same bandwidth. The internet has no inherent way to prioritize one type of traffic over another; Oracle SD-WAN creates liquidity for all possible pathways and provides platinum QoS pipes.

- Blue chip applications, such as VoIP and those that manage core business processes, are like the ace of spades or face cards in poker—high value and essential to your most critical operations.
- Bulk file sharing and guest Wi-Fi are like the two of hearts or diamonds—important in many scenarios, but not generally as high-value as business-critical applications.
- Every Oracle SD-WAN Edge appliance within the SD-WAN overlay is fully aware of all bandwidth, both ingress and egress, at every Oracle endpoint. This knowledge enables the SD-WAN to permit or deny bandwidth for any given application. Additionally, Oracle can preserve QoS inbound through the last mile, preserving a predictable quality of experience (QoE) for the end user.

Every application has unique packet characteristics that impact the network as it is routed from its origin to its destination. How these distinct packets are sorted once they reach the WAN edge is important. Oracle's proprietary protocol performs millisecond, packet-by-packet, unidirectional measurement of latency, jitter, and packet loss, and dynamically selects the right WAN path each time.

Oracle intelligent path control uses a patented approach to optimal QoE selection.

Oracle's intelligent path control uses a patented approach to optimal QoE selection. By timestamping every packet using its TRP protocol at microsecond granularity, Oracle SD-WAN makes real-time, per-packet decisions as to which path to put a frame on for transport. This enables Oracle SD-WAN to use the best path for each packet.

Oracle's unique packet duplication capability matches each application with the most appropriate path characteristics to ensure applications are reliable with optimal performance. Now you can stack the deck to your advantage by ensuring your most important traffic always receives the most reliable network service.

TRANSFORMATION #3

Cloud Integrations

Imagine playing a high-stakes hand of poker—but only two of your card faces are visible. How can you bet on a hand like that? Something similar happens with legacy WANs that take on cloud applications. Questions erupt such as:

- Is my cloud traffic truly secure?
- What if my end-users can't access their apps in time?
- How do I prioritize applications with users?

A unified SD-WAN can clear up the confusion:

- Oracle SD-WAN can bookend applications running through Amazon Web Services or Microsoft Azure clouds, as well as other edge colocation facilities.
- Oracle SD-WAN intelligently forwards select traffic to cloud security platforms, such as Zscaler via IPsec tunnels.

- Instead of combining physical or virtual devices from a variety of vendors, a single Oracle SD-WAN Edge appliance does the work of many, reducing device sprawl, simplifying deployment, easing ongoing support, and lowering costs. Oracle serves as a unified platform with firewall, NAT, routing, WAN optimization, virtual routing and forwarding (VRF), VPN, dynamic host configuration protocol (DHCP), and IPsec termination.
- Oracle delivers continuous, unidirectional monitoring with detailed visibility and reporting on WAN performance. Network administrators are no longer stuck playing the hand they're dealt. They can expect a dramatic drop in the number of trouble tickets after deploying SD-WAN compared to conventional, obsolete WAN architectures.

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TRANSFORMATION #4:

Bandwidth Arbitrage of Commodity Internet

A failsafe SD-WAN ensures you have more cards up your sleeve to keep cloud connectivity intact—without breaking the bank:

- Oracle SD-WAN is agnostic to all carrier and transport methodologies. Companies can use any carrier and easily migrate from one to another, aggregating multiple bandwidth sources and transports such as MPLS, very small aperture terminal (VSAT), LTE, broadband or digital subscriber line (DSL) internet, and dedicated internet access (DIA).
- Economical wireless options, such as LTE, can be used for additional bandwidth while ensuring overall network reliability and resiliency.
- Direct cloud connectivity is provided while eliminating the *trombone effect*—when network traffic from remote locations is backhauled to the corporate data center before exiting to the internet, adding latency that can adversely impact the user experience.

***Backhaul Traffic* Defined**

When network traffic from remote locations is sent back to the corporate data center before exiting to the internet, adding latency that can adversely impact the user experience.

With their mix of legacy equipment, long deployment times, and expensive bandwidth, naked MPLS links are all or nothing gambles. You end up paying a high price for resources, such as backhaul traffic taxes.

TRANSFORMATION #5

Securing Cloud-Bound Traffic

Oracle offloads all Internet traffic, or specific URLs, directly at the branch, using Oracle's integrated NAT and port address translation (PAT) firewall and domain name system (DNS) proxy for URL redirection to the internet for trusted URLs. Oracle supports terminal access controller access-control system plus (TACACS+) and remote authentication dial-in user service (RADIUS) authentication for management access to its edge appliances. Every packet is encrypted by default, using Oracle's AES encryption. Oracle SD-WAN app-centric cloud security utilizes the Zscaler security service, a joint validated solution that provides web filtering within cloud nodes distributed worldwide. This provides centrally controlled security with decentralized access, avoiding backhauling Internet traffic across MPLS links.

Oracle SD-WAN appliances transparently forward all internet traffic to the Zscaler cloud over IPsec tunnels, providing a faster user experience, reducing bandwidth costs, and simplifying operations. Oracle delivers:

- IPsec tunnels to the Zscaler cloud with one active tunnel per Oracle SD-WAN appliance.
- Oracle app-aware routing rules selectively determine what traffic to forward to Zscaler.

- Secure internet breakouts eliminate the cost and complexity of deploying additional security appliances on customer premises.

Oracle SD-WAN with Zscaler provides failsafe connectivity while leveraging a direct-to-cloud gateway security stack as a service. This continuously applies policies and threat intelligence to protect organizations from malware and other advanced threats. By moving security and access controls from the data center to a globally distributed cloud, enterprises achieve consistent protection for users everywhere. They can now easily scale to support dynamic changes in traffic flows in today's increasingly cloud-centric infrastructure.

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THE WILDCARD

Zero-Touch Provisioning and Deployment

Every strong hand needs a wildcard. Oracle enables the cost effective deployment of applications that are otherwise difficult to implement and support over far-flung WANs.

Provisioning and deploying Oracle SD-WAN in the branch is agile, fast, and simple. By completing three simple steps, IT personnel can have an Oracle SD-WAN Edge appliance online and in production.

1. Physical appliances are configured prior to shipping and virtual appliance images are burned prior to posting. As a result, in many cases organizations do not need technical personnel physically in the branch to install the Oracle SD-WAN.

2. All administration and reporting takes place from Oracle's centrally managed SD-WAN controller.

3. Companies benefit from the minimized amount of IT expertise required at each branch while gaining a scalable WAN capable of supporting large numbers of branch offices. Failsafe Oracle SD-WAN makes the edge network more resilient by creating a fault-tolerant WAN using multipath reliability and eliminating single points of failure. Even when temporarily taking a network link out of service, Oracle SD-WAN will maintain unbroken application sessions by moving the sessions to other working network links through the path or paths of least resistance.

THE INDUSTRY'S MOST COMPREHENSIVE FAILSAFE SD-WAN

Oracle SD-WAN helps lower costs, simplify management, secure networks and applications, elevate network and application performance, and improve WAN reliability for enterprises with cloud-hosted applications and geographically distributed offices. Oracle SD-WAN takes advantage of available WAN connections, while centralizing control of, and visibility into, the entire SD-WAN fabric. WAN management is easy and secure, with business-class connectivity that is agnostic to the underlying transport—enabling multiple, diverse links rather than expensive and rigid circuits.

The Oracle SD-WAN brings cloud economies of scale with flexible, scalable bandwidth, failsafe reliability, and fast deployment. This approach future-proofs enterprise WANs as data and applications continue to grow exponentially, connecting to SaaS, IaaS, and public cloud services.

Don't gamble with your WAN, especially as you extend it to the cloud. A Oracle SD-WAN is your winning hand to a more reliable, flexible, secure and scalable network that continually adapts to changing requirements.

Benefits of Oracle SD-WAN

Oracle SD-WAN can help enterprises with cloud-hosted applications and geographically distributed offices to

- Lower costs
- Simplify network management
- Secure networks and applications
- Elevate network and application performance
- Improve WAN reliability

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Integrated Cloud Applications & Platform Services

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