ORACLE SDN

Oracle Software Defined Networking (Oracle SDN) boosts application performance and management flexibility by dynamically connecting virtual machines (VMs) and servers to networks, storage devices, and other VMs. With it, you can gain the performance benefits of up to 80 Gb/sec server-to-server throughput and realize up to 19 times faster live migration, 12 times faster database queries, and 30 times faster backups than legacy systems. Oracle SDN provides virtual networking flexibility that costs 50 percent less than legacy networking systems.

Achieving the Potential of Cloud Data Centers

Cloud data center architectures promise the agility you need in order to quickly deploy applications, maximize efficiency, and deliver a great user experience. But legacy network infrastructure can prevent you from reaching those goals. Outdated technologies that rely on switches and ports essentially tie applications to specific servers. Complex mappings, configuration settings, and hardwired connections require days or weeks to modify, often demanding painstaking coordination among multiple teams. Performance bottlenecks may be difficult to identify and even harder to fix. And in multitenant environments, how do you ensure data isolation and meet service-level agreements (SLAs) with a shared infrastructure?

What’s needed is a virtualized connectivity model, one that matches the efficiency, simplicity, and hardware independence of server virtualization itself.

Oracle SDN: Virtualizing the Data Center Infrastructure

Oracle SDN redefines server connectivity by employing the basic concepts of virtualization. Unlike legacy port- and switch-based networking, which defines connectivity via complex LAN configurations, Oracle SDN defines connectivity entirely in software, using a supremely elegant resource: the private virtual interconnect. A private virtual interconnect is a software-defined link between two resources. It enables you to connect any virtual machine or server to any other resource—including virtual machines, virtual appliances, bare metal servers, networks, and storage devices—anywhere in the data center. Connect in seconds without inflexible network configuration, and gain the flexibility and agility you need in order to take control of your cloud.

Private Virtual Interconnect for Isolated Connectivity

The private virtual interconnect is an isolated link that connects virtual machines to other data center resources. Being a software-defined network, it can be deployed in seconds. You can use private virtual interconnects to join any number of virtual machines, virtual appliances, networks, storage devices, and bare metal servers in isolated layer 2 (L2) domains.

Legacy networking technologies, by contrast, require complex configuration of switches, switch ports, and virtual local area networks (VLANs) to route data among resources. Because these assets all reside in the network environment, they must be configured with careful consideration of the overall networking context.
With Oracle Virtual Networking, connections are configured within Oracle SDN. Private virtual interconnects do not rely on VLAN or port configurations and are not even visible to external networks unless specifically configured for this.

Figure 1. Private virtual interconnects enable you to flexibly connect from virtual machines to other resources. These connections exist within Oracle SDN, so there is no need to modify network configurations. They are also isolated and not visible to networks or other connections unless specifically configured for this.

Elimination of VLAN Exhaustion
The private virtual interconnect does not consume VLANs or Ethernet address space because it does not rely on traditional networking concepts to ensure isolation from other connections. As a result, VLAN exhaustion is no longer an issue.

Speed and High Scalability
With bandwidth of up to 80 Gb/sec per server connection, Oracle SDN provides exceptional performance. Each private virtual interconnect also has bandwidth of up to 80 Gb/sec to deliver the industry’s fastest, most scalable fabric. A single fabric can accommodate as many as 1,000 servers and as many as 64,000 private virtual interconnects. Fully autorouting, the fabric self-configures for efficient data transport.

Investment Protection and Infrastructure Convergence
A single fabric link (or dual links for redundancy) carries both Ethernet and Fibre Channel traffic, resulting in maximum management simplicity and the lowest-possible physical complexity. Oracle Virtual Networking protects your existing network investment by presenting standard Ethernet and Fibre Channel interfaces to your core networks. Within each host, the connectivity appears as conventional Ethernet network interface cards (NICs) and Fibre Channel host bus adapters (HBAs). Oracle Virtual Networking is proven interoperable with gear from all major network providers—including Oracle, Brocade, Cisco, and Juniper—and with all x86 servers.

Redundancy for High Availability
Three levels of redundancy ensure superior availability. First, in the event of a server connection failure, traffic is automatically failed over to a separate data path. Paths are isolated so that no path has the ability to degrade the other’s functionality. Second, in the event of a link failure within the fabric itself, traffic is rerouted over the remaining links with no interruption. Third, all forwarding tables are stored at multiple locations, ensuring fabric resilience.

Ability to Deploy Multitenant Environments Rapidly
When multiple users share resources, it is often essential to segregate network and storage data paths to ensure isolation. The private virtual interconnect makes that easy. Because it operates as a standalone Layer 2 network, data is visible only to the resources connected to that private virtual interconnect. User applications and data can be fully isolated from other users’ assets, exactly as if they resided on physically separate infrastructures. Predictable application performance is ensured by granular quality-of-service controls for network and storage access. You can create fully isolated virtual data centers within a shared environment, meet application SLAs, and then quickly reallocate resources when requirements change.
Integration of Virtual Appliances to Build Virtual Data Centers

Virtual appliances can save you time, money, power, and rack space by letting you replace hardware appliances with special-purpose software that runs on virtual machines. Available with functions such as firewalls, load balancing, routing, and WAN acceleration, virtual appliances from Oracle partners form key building blocks of the next-generation data center.

Oracle SDN provides the ideal complement to virtual appliances, by making them easy to deploy, configure, and manage. With Oracle SDN, you can quickly configure isolated connectivity—and deliver up to 80 Gb/sec bandwidth on each connection—with private virtual interconnects. Create fully functional data center topologies as easily as you would create a Visio diagram. End users can even create isolated connections themselves within virtual data centers, giving them complete independence to manage their resources without affecting other users.

Intuitive Single-Screen Management

Manage all your data center connections from a single screen. The Oracle Fabric Manager interface enables you to view private virtual interconnects, virtual machines, virtual switches, physical hosts, and network and storage resources. With it, you can configure connectivity, monitor performance, and modify parameters from any location, all on live servers.

To create interconnects, simply drag and drop resources on the topology map. Data is then automatically routed over Oracle SDN without the need to configure any intermediate assets. You can create complex network topologies in seconds and interconnect all elements with isolated links. Templates enable you to provision connectivity on multiple servers simultaneously. You can also generate scripts within the command-line interface to automate repetitive configuration tasks.

Ability to Start Small and Grow

Oracle SDN enables you to start with a small deployment and grow over time. It works with your existing 1GE, 10GE, and Fibre Channel switching infrastructure and is interoperable with virtually every x86 server available, including rack- and blade-based systems. As you grow, simply add new Oracle Virtual Networking components and connect them to build a fabric. You can start with a small number of servers and grow to a thousand.
Figure 3. Oracle Virtual Networking replaces complex network configuration settings with simple, software-defined networks. With Oracle SDN, you can directly connect VMs to legacy networks, storage devices, bare metal servers, and other VMs. With just two physical connections per host and a 70 percent simpler infrastructure, Oracle Virtual Networking reduces cost while giving you complete flexibility.

Figure 4. In this view of legacy networking, connections from virtual machines to networks and storage are defined by complex network settings on multiple networks and VLANs. The topology includes multiple layers of networking and numerous network and storage connections per server, all of which degrades performance and adds cost and management complexity.
Solution Elements

Oracle SDN is built on Oracle Fabric Interconnect, a solution proven in hundreds of deployments at Fortune 500 companies, service providers, government entities, and more. The complete Oracle SDN solution consists of the following elements:

- **Oracle Fabric Interconnect.** Providing connectivity to external networks and storage, it can be connected directly to servers or via expansion switches for increased scalability. As many as eight Oracle Fabric Interconnects can be managed on a single Oracle SDN.

- **Oracle Virtual Networking software.** Oracle Fabric Manager and Oracle Fabric Monitor provide a single-screen view of connectivity across the data center. You can begin with a rack-size solution built on Oracle Fabric Interconnects and then scale seamlessly to a data-center-wide deployment by adding Oracle SDN software enhancements at any time.

![Figure 5. Oracle Fabric Manager’s interface enables you to view private virtual interconnects, virtual machines, virtual switches, physical hosts, and network and storage resources. You can configure connectivity, monitor performance, and modify parameters from any location, all on live servers.](image)

**Lower Cost Than Legacy Infrastructure**

Compared to legacy infrastructure, Oracle SDN requires 70 percent fewer physical components and saves 50 percent on capital costs. In most deployments, the Oracle Virtual Networking solution saves money on the first day. Because connectivity is managed entirely in software, modifications are completed in minutes rather than hours or days. Rapid provisioning boosts resource utilization, resulting in lower costs and a more responsive end user experience.
ORACLE VIRTUAL NETWORKING

Oracle Virtual Networking revolutionizes data center economics by creating an agile, highly efficient infrastructure built on your choice of hardware and software. This open architecture enables you to dynamically connect servers, networks, and storage. You create networks and connections entirely in software to enable secure, isolated services that support your business processes and priorities. With Oracle Virtual Networking, all traffic types, including Ethernet and Fibre Channel, traverse a converged infrastructure, resulting in a simpler, more efficient, wire-once environment with flexible connectivity.

Products in the Oracle Virtual Networking family include
• Oracle Fabric Interconnect
• Oracle Fabric Manager
• Oracle Fabric Monitor
• Oracle SDN

Contact Us

For more information about Oracle SDN, visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.

Figure 6. Servers connect to Oracle Fabric Interconnects, which then connect to existing networks and storage devices via standard Ethernet and Fibre Channel connections. Each server connection delivers up to 80 Gb/sec bandwidth, eliminating I/O bottlenecks. Oracle SDN includes the management software and drivers required to manage connectivity fabricwide.