iSCSI with DCB Protocol Package
The industry's premiere validation system for SAN technologies

Overview

Load DynamiX offers SCSI over TCP/IP transport (iSCSI) support to its existing powerful suite of file, block and object-based storage validation solutions. The iSCSI offering includes a full-featured initiator and target, which is essential for system level validation of storage products as well as storage networking environments.

The improved Load DynamiX 1G Series and 10G Series appliances incorporate the iSCSI functionality in 1 GigE and 10 GigE. The powerful system has the ability to drive iSCSI traffic at line rate on every port at all supported speeds. The iSCSI protocol support includes connectivity directly to iSCSI targets and other critical networking elements such as Top of Rack (ToR) switches and WAN Optimization appliances.

A rich suite of SCSI commands is presented for detailed system level testing. The suite covers a thorough set of SCSI commands for disk, tape and virtual tape. Commands specified to the user are injected directly at the SCSI layer, ensuring unparalleled performance, repeatability and scalability. Tests can be executed either through Load DynamiX's powerful GUI, or from scripts using the automation API.

Test Topologies

The initiator can connect directly to storage arrays and create huge amounts of realistic I/O load patterns to test the storage under punishing conditions.
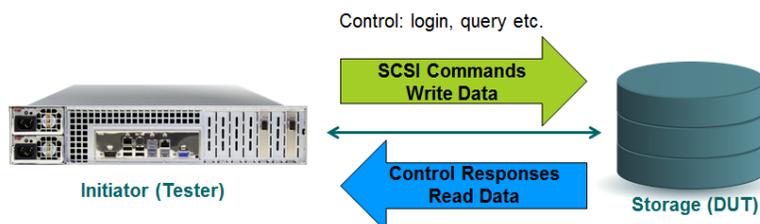
Highlights

- Attain fine grain control over data traffic at the SCSI level
- Ensure exact SCSI workload replication
- Validate advanced functions including caching, backup, and virtual server storage offloads
- Integrated Lossless Ethernet (DCB) support
- Gain full support of all major SAN, NAS and Object protocols

Illustration 1. Validating iSCSI targets with realistic workloads and storage functions

It can also connect to storage via a SAN and thus be used for SAN testing. Both the storage and the SAN can be independently subjected to varying types of load, and the performance characterized easily. The amount and variety of load created can ferret out bugs ever faster than was possible heretofore.
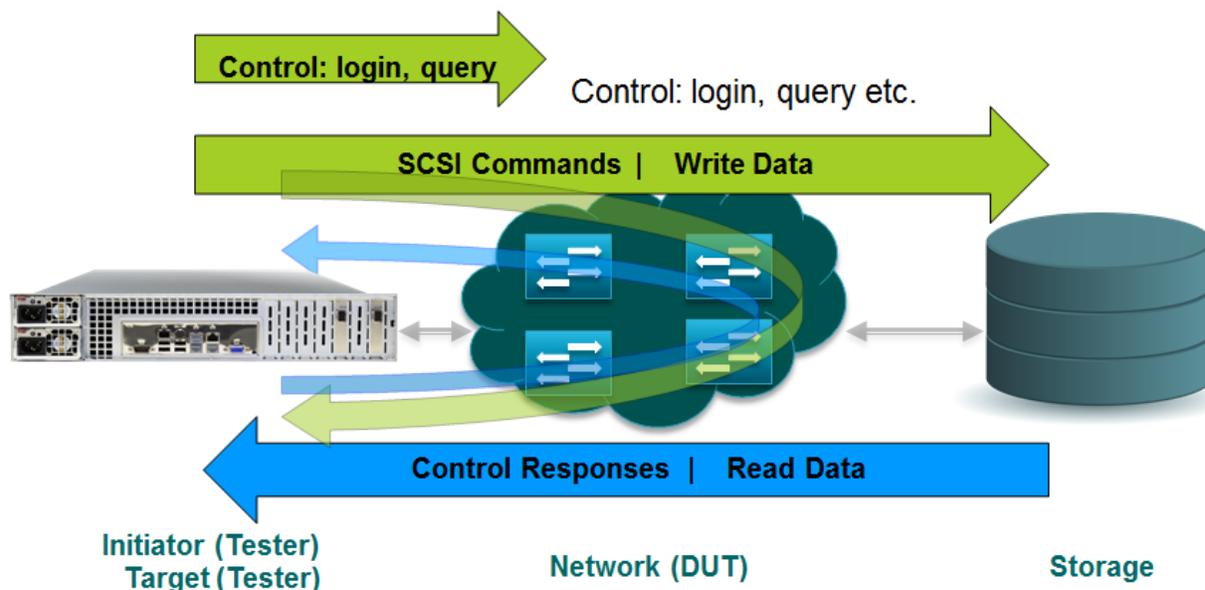

Illustration 2. Validating DCB-enabled data center switches with iSCSI deployment

One of the most critical components of network storage over public and private clouds is the WAN Optimization appliance. Having a highly precise and efficient optimization engine ensures the delivery of key SLA and business critical application criteria such as data retrieval latency, reliability and availability.
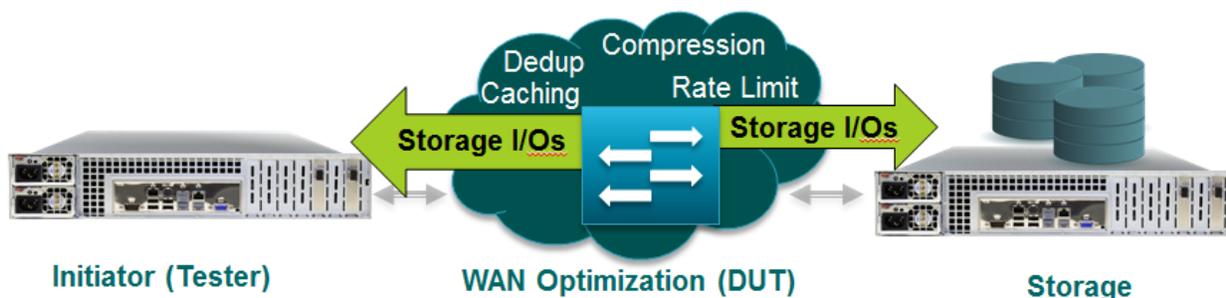

Illustration 3. Validating WAN Optimization systems and deployment

Key Features

Initiator Emulation Realism	■ Realistic emulation of iSCSI initiators with the ability to emulate multiple scenarios from a single interface ■ Login authentication support with CHAP ■ Advanced iSCSI session management functions including auto redirect, reconnect, async logout ■ Support for direct access block devices (e.g. SSDs, disks) and stream devices (e.g. tapes, VTLs) ■ Validate advance storage features such as virtual server storage offloads (e.g. VAAI) ■ Direct SCSI layer control without OS interventions allows for realistic simulation of application unique workloads ■ Vary the ratio of sequential disk access and random disk access ■ Configurable network options supporting VLAN tagging, IPv4, IPv6 and MAC address assignment with increment schemes for emulation of millions of unique clients ■ Verify lossless iSCSI with DCB (Data Center Bridging) for converged data center networks
Test Modeling	■ Flexible scenario modeling with looping constructs, user parameter files, and functions for unique parameter usage such as creating complex disk access patterns ■ Set independent, iterative load profile objectives for each parallel scenario to assess scalability including: concurrent scenarios, new scenarios per second, concurrent actions, new actions per second, concurrent connections, new connections per second, and throughput.
Content Creation / Data Verification	■ Create complex read / write characteristics with varying IO chunk sizes and IO transfer sizes for block storage ■ Support for reading and writing large files with diverse data patterns: sequential, random, seeded random, and user supplied files ■ Data verification options to ensure the integrity of data written to target storage

Commands	■ SCSI command sequencing control within scenarios to emulate any complex workload that represents initiator, application and device behaviors. Supported commands include:
	  - **SCSI Primary Commands (SPC):** commands that apply to all SCSI devices such as INQUIRY, MODE SENSE, and TEST UNIT READY
	  - **SCSI Block Commands (SBC):** commands that apply to Block devices (e.g. SSDs, disks) such as VERIFY, WRITE SAME, and the direct access READ and WRITE operations
	  - **SCSI Stream Commands (SSC):** commands that apply to Stream devices (e.g. tapes, VTL) such as REWIND, SPACE,

	and the stream access READ and WRITE operations
Initiator / Target Support	▪ End-to-end initiator and target emulation for validation of data center infrastructure including Top-of-Rack switches and lossless Ethernet (i.e. DCB) switches, and content-aware network functions including Firewalls, Application Delivery Controllers and WAN Optimization Appliances.
Automation	▪ Automate any task needed with the protocol commands supported using scripting languages: Perl, Ruby and Python

Statistics

Actions / IOPS	iSCSI Action counts or Actions/sec (average for all or individual Actions)
iSCSI Details	iSCSI command transmission/receipt OK/Fail/Drop in packets/sec or bytes/sec
iSCSI Response Time	iSCSI command response time (average, minimum, maximum)
iSCSI IO Throughput	iSCSI packet or byte throughput on per command or All basis
TCP Connection Time	Connection Time (Avg. Duration, Time-to-1st-Byte, Closing Time)
TCP Connections	Attempts, Opened, Closed, Failed, Reset, Timeout (Open, Data, Idle, ARP, SYN), SYN Rejected
TCP Throughput	TCP packet throughput on per command or All basis
TCP Details	Tx (OK, Retransmissions, Out-of-Sequence,), Rx (Ok, Length Error, Drop, Duplicate, Out-of-Sequence, Rejected, Invalid Destination)
Data Verification	iSCSI data verification operations attempts, successes, failures

Supported Platforms

Load DynamiX 1G Series Appliances
Load DynamiX 10G Series Appliances