

## Fibre Channel / SCSI Protocol Package

The industry's premiere validation system for SAN technologies

### Overview

Load Dynamix offers SCSI over Fibre Channel transport support to its existing powerful suite of file, block and object-based storage validation solutions. The Fibre Channel offering includes a full-featured initiator, which is essential for system level validation of storage products as well as storage networking environments.

The Load Dynamix FC Series appliance incorporates the FC functionality in 4G and 8G speeds. The powerful system has the ability to drive FC traffic at line rate on every port at all supported speeds. The FC protocol support includes connectivity directly to FC targets and to the FC SAN switches. Targets are automatically discovered.

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.

### 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
- Gain full support of all major SAN, NAS and Object protocols

### 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.

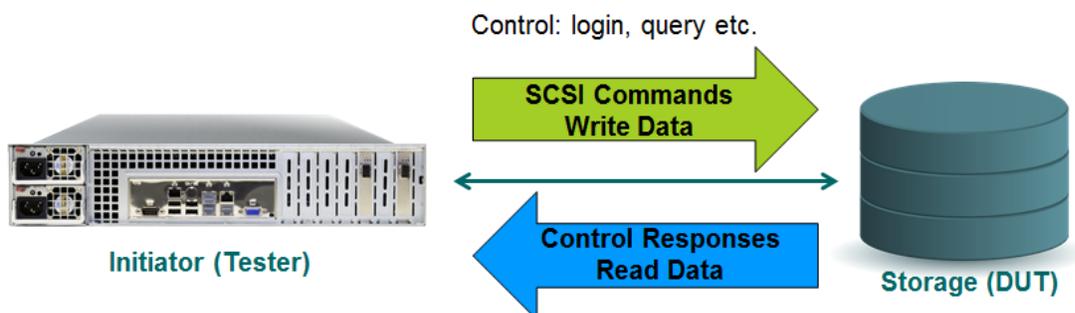
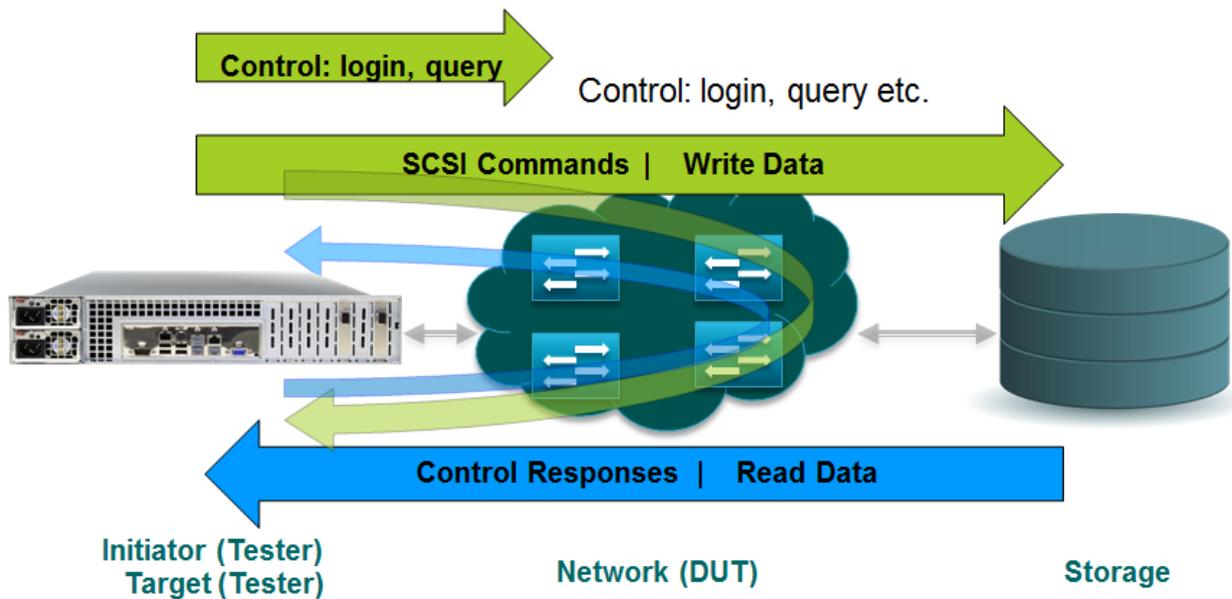


Illustration 1. Validating FC targets with realistic workloads and storage functions

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 data center SAN switches with FC deployment**

## Key Features

<p><b>Initiator Emulation Realism</b></p>	<ul style="list-style-type: none"> <li>▪ Realistic emulation of FC initiators with the ability to emulate multiple scenarios from a single interface</li> <li>▪ N_Port ID Virtualization (NPIV) support simulates virtualized Fibre Channel hosts in data center networks with customized WWPN settings</li> <li>▪ Support for direct access block devices (e.g. SSDs, disks) and stream devices (e.g. tapes, VTLs)</li> <li>▪ Validate advance storage features such as virtual server storage offloads (e.g. VAAI)</li> <li>▪ Direct SCSI layer control without OS interventions allows for realistic simulation of application unique workloads</li> <li>▪ Vary the ratio of sequential disk access and random disk access</li> </ul>
<p><b>Test Modeling</b></p>	<ul style="list-style-type: none"> <li>▪ Flexible scenario modeling with looping constructs, user parameter files, and functions for unique parameter usage such as creating complex disk access patterns</li> <li>▪ 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</li> </ul>
<p><b>Content Creation / Data Verification</b></p>	<ul style="list-style-type: none"> <li>▪ Create complex read / write characteristics with varying IO chunk sizes and IO transfer sizes for block storage</li> <li>▪ Support for reading and writing large files with diverse data patterns: sequential, random, seeded random, and user supplied files</li> <li>▪ Data verification options to ensure the integrity of data written to target storage</li> </ul>
<p><b>Commands</b></p>	<ul style="list-style-type: none"> <li>▪ SCSI command sequencing control within scenarios to emulate any complex workload that represents initiator, application and device behaviors. Supported commands include:             <ul style="list-style-type: none"> <li>- <b>SCSI Primary Commands (SPC):</b> commands that apply to all SCSI devices such as INQUIRY, MODE SENSE, and TEST UNIT READY</li> <li>- <b>SCSI Block Commands (SBC):</b> commands that apply to Block devices (e.g. SSDs, disks) such as VERIFY, WRITE SAME, and the direct access READ and WRITE operations</li> <li>- <b>SCSI Stream Commands (SSC):</b> commands that apply to Stream devices (e.g. tapes, VTL) such as REWIND, SPACE, and the stream access READ and WRITE operations</li> </ul> </li> </ul>
<p><b>Automation</b></p>	<ul style="list-style-type: none"> <li>▪ Automate any task needed with the protocol commands supported using scripting languages: Perl, Ruby and Python</li> </ul>

## Statistics

<b>Actions / IOPS</b>	FC SCSI Action counts or Actions/sec (average for all or individual Actions)
<b>FC SCSI Details</b>	FC SCSI command transmission/receipt OK/Fail/Drop in packets/sec or bytes/sec
<b>FC SCSI Response Time</b>	FC SCSI command response time (average, minimum, maximum)
<b>FC SCSI IO Throughput</b>	FC SCSI IOs packet or byte throughput on per command or All basis
<b>FC Sessions</b>	Attempts, Opened, Closed, Failed, Reset, Timeout
<b>FC Session Time</b>	FC SCSI session time (average, minimum, maximum)
<b>FC Network Bandwidth</b>	FC packet or byte throughput
<b>Data Verification</b>	FC SCSI data verification operations attempts, successes, failures

## Supported Platforms

Load Dynamix FC Series Appliances