FlameThrower

FlameThrower product family represents the industry's first scalable attack and multi-layer traffic emulation tools for supporting vital e-Business networks. It offers a unique and portable hardware/software solution that delivers true wire-rate multi-layer traffic emulation with one product.

This is a powerful standards based application traffic emulation solution that supports HTTP 1.0/1.1, FTP, SMTP, POP3 and other Internet protocols. It has the ability to emulate over 2,000,000 users and 20,000,000 concurrent connections.

FlameThrower version 5.0 has been successfully launched and currently boasts of over 200 clients from Fortune 1000 companies.

FlameThrower Family consists of following products:

- **WebStressor**
- **FirewallStressor**

WebStressor

This produces actual Internet protocol transactions at tremendous loads and speeds to stress the entire infrastructure. It emulates traffic conditions that require full application acknowledgments, stressing web sites with over half a million unique users; all from one simple appliance without the time and cost required to set up hundreds of test PCs.

FlameThrower incorporates an intuitive user interface with powerful real-time reporting functionality, allowing users to configure and execute tests in minutes. All tests are repeatable, and demonstrate the effectiveness of optimization and changes made in the infrastructure.

Following features were successfully incorporated in FlameThrower by ControlNet India.

- Developed customized protocol stack for HTTP, FTP, SMTP, POP3, HTTPS, LDAP, Streaming, HTTP IPV6 and DNS. All the protocol modules were handled at packet level
- Provided support in HTTP client/server modules for VLAN 802.3 frames as described through the 802.1Q standard
- Server Load Balancing features by which user can easily validate the functionality of Server Load Balancers
- Proxy feature in HTTP, FTP client modules with which user can verify the behavior of proxy servers under stress

- UniqueMAC per IP feature that allows generation of unique MAC per client IP address or a range of client IP addresses
- Segmented IP for HTTP client module to allow generation of various IP address segments from the complete IP address space
- Driver for detecting Gigabit and 10/100 cards supported by FlameThrower and ASIC register/memory manipulations as per user configurations
- Extensive counter support though which user can quickly analyze the working of client/server modules

FirewallStressor

FirewallStressor module has the unique ability to provide actual cyber attack profiles to determine the effectiveness and performance of security counter measures. FirewallStressor is the only solution that illustrates how much user traffic can get through, even when a site is under attack. Some of the attacks emulated are:

- SYN Flood Attack Illegal TCP/IP Packets
- LAND Attack CRC Error Packets
- Tear Drop Attack Short Frame Packets
- IP Spoofing Attack Long Frame Packets
- Ping of Death Attack ICMP Attack

WebStressor and FirewallStressor applications of FlameThrower family are VxWorks based embedded solution on Ocelot MIPS boards.

GT View

GT-View is a layer 2 and 3 traffic generating software that transforms FlameThrower into a wire rate bit blaster and network analysis solution providing complete layer 2 through layer 7-load stressing. Another advantage of GT-View is that it can be used to test network infrastructure like hubs, switches, routers etc using the test suites provided. API's to write custom tests in Java and Tcl are also provided.

IEEE 1394-FireWire

FireWire is a high-speed media standard that supports peer-to-peer transfer at the rate up to 400 Mbps at present. ControlNet provides complete Firewire solution comprising – Silicon proven 1394a PHY, OHCI Link and Drivers.

Following is the list of software developed for 1394.

Debugger:

A debugger is useful software, which interacts with hardware at very basic level and helps in debugging the hardware and help software development.

The debugger developed is an OHCI card debugger for ControlNet's S5B and TI's OHCI cards. It can be used for any OHCI card. It performs register reads and writes as well as sends and receives various types of Asynchronous and Isochronous traffic.

It was developed in PSX, a real time kernel.

Driver:

We have developed a NDIS 3.0 driver for S5B OHCI card. NDIS is Windows network driver standard (Network Driver Interface Specification). The driver can be installed on Windows NT 3.51 and Windows NT 4.0 system. It uses OHCI as communication protocol with the card and deals with Asynchronous traffic.

With the help of this driver, a Windows machine with the S5B or any OHCI card can communicate with other machines over FireWire media using TCP/IP.

1394 Device Software:

The software includes FireWire stack for Linux, Control software for the device and debugger/tester for the device.

FireWire Stack:

Firewire stack in Linux includes OHCI driver for Linux, providing APIs for user applications and developing a module to communicate between these two.

Control Software:

The control software for device communicates with the device Control Port using OHCI interface. It uses a part of specifically modified Linux 1394 stack for its operations. A UI developed in GTK is also available for a convenient control over the switch.

Device tester:

This software uses the Linux 1394 stack and aids in testing/debugging the device with the help of a sophisticated UI developed in GTK. A set of machines, which participate in the

testing, communicate with each other using socket interface and exchange commands and statistics.

8 Port 10/100 Ethernet Switch

Catapult 1.0 is a 8-port 10/100 Mbps Ethernet switch. The switch engine is the Catapult 1.0 ASIC. The ASIC is programmable through the CPU - Dallas 80C320.

The CPU runs a monitor program, which executes the following three tasks.

1. **Address Learning Algorithm** – Fills up the Ethernet Address and Port Number in the Table.
2. **Aging of the Entries in the Address Table** – Increments the age of the entries in the Table and deletes any expired entries from the Table creating space for new entries to be created.
3. **Debugger Task** - Allows viewing and programming of ASIC registers through a user-friendly interface on the host PC to which the switch can be connected through a serial port.

Tools Used:

- KEIL DK51 IDE for 8051 software development
- CEIBO In circuit emulator for 8051 for target level debugging
- Microsoft Visual C++ for developing the Debugger GUI

PCIMAC

1. **Debugger for ControlNet's PCIMAC**

This software interacts with PCI based network card / hardware at low level, and helps in debugging the hardware and further software development. It performs register read/writes and supports interrupt handling by various methods.

This debugger runs under DOS with a very intuitive User Interface, makes debugging process very easy for hardware engineers.

2. **Diagnostic Software for ControlNet's PCIMAC**

This is a useful utility, which carries out some standard tests on the NIC and network to diagnose any problem coming at users place. This is developed for DOS and user can fix any problem in the network using its sophisticated UI. This software ships with the driver diskette.

3. **NIC drivers for DECChip 21140 and ControlNet's PCIMAC:**

- Packet driver for DOS
- NDIS 2.01 for Windows for Workgroup 3.11
- NDIS 3.0 for Windows NT 3.51 and Windows 95
- NDIS 4.0 for Windows NT 4.0 and Windows 98
- NDIS 5.0 for Windows 2000
- Tested with HCT (Hardware Compatibility Test) suite provided by Microsoft to confirm their reliability and endurance
- Linux driver
- SCO Unix driver
- Net BSD driver
- ODI 16 driver for Novell Netware
- ODI 32 driver for Novell Netware
- PSX (Real time OS from JMI) driver