

# Detecting Problems and Taking Action Inside the LAN: Use Cases



SEE

UNDERSTAND

RESPOND

## The Network Interior: A Different Landscape

Effective response to internal threats relies on identifying "bad" traffic and taking swift surgical action to eliminate it.

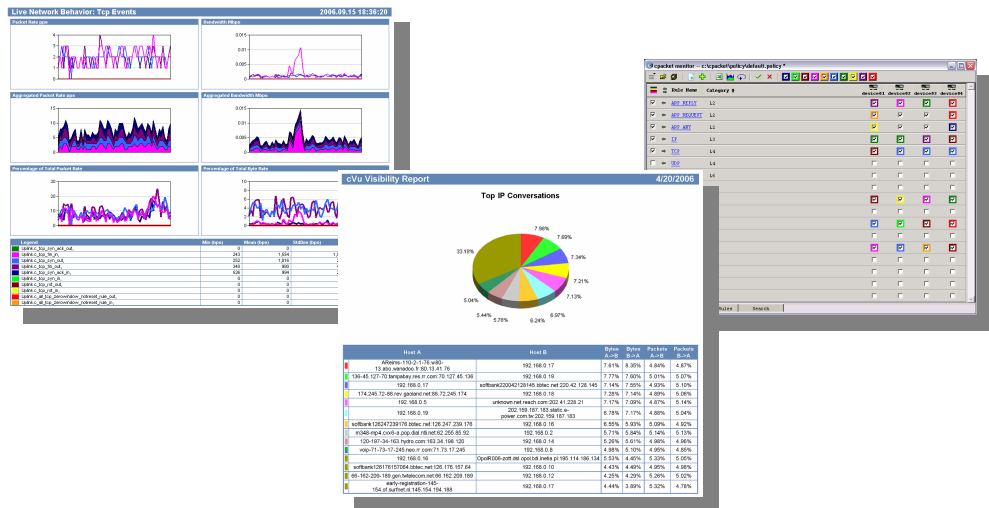
Internal threats to an organization's network pose different challenges than external threats from outside the network perimeter. Perimeter defenses do not address infection vectors that are created by the intentional or unintentional acts of the organization's own users. Furthermore speeds in the LAN are orders of magnitude greater than at the perimeter gateway and the traffic is more varied. Therefore, perimeter defenses need to be complemented by internal visibility and control points.

The cVu 1000 system provides network traffic visibility and control for internal network traffic. It can provide insight into application traffic behavior and can be used to identify threats and to contain infections. The OPSEC integration with Check Point products like FireWall-1 and Eventia delivers broad coverage and response capabilities.

## cVu System

cPacket Network's cVu 1000 is an appliance for "active network traffic inspection and response". It inspects every bit in every packet to provide granular visibility and control of network traffic. cPacket's unique custom ASIC enables full gigabit line rate inspection regardless of packet count and size mix. The appliances support actions such as counting, dropping, duplicating, and rate limiting of specific traffic profiles based on any combination of bits and patterns in the packet header and payload.

Each cVu 1000 is installed as a transparent "bump in the wire" and requires no changes to existing addressing schemes; appliances can also be attached to passive taps or mirror ports of switches. Multiple devices can be distributed in the network at strategic locations and managed from a central command center. The information from multiple cVu appliances is aggregated by a management server that provides graphical visualization of both live and historical reports that are accessed over a web browser. Detailed information at fine resolution (one second) includes bandwidth utilization, application traffic profiles, top talkers, top consumers, and TCP and UDP top conversations.



In addition to visualization and reporting, the cVu system can be used for identifying and responding to network and security problems. A simple GUI enables users to create custom rules as needed. Users can set triggers for situations that require intervention – anomalous network behavior, unbalanced request-replies (e.g. DHCP, ARP, DNS), attempts to communicate with "dark IPs", application error messages, excessive failed login attempts, application masquerading, passwords in the clear, and other signs of compromised or misconfigured networks. The system can send OPSEC compliant alerts and integrate with Check Point's management and logging infrastructure.

## Detecting Threats & Anomalies Then Taking Action

Securing the internal network requires the ability to see the issues when they occur, understand the nature of the problem, and respond with the appropriate action. The action should be surgically precise and affect only the “bad” traffic without penalizing performance. The following examples demonstrate how cVu appliances can help network managers detect problems and take proactive steps to secure their networks.

### Dark IPs – Worm Behavior

The presence of network traffic with unused destination addresses (“dark IPs”) is often indicative of a possible worm infestation. The worm tries to scan the network to find vulnerable machines to infect. Therefore, monitoring network traffic to “dark IPs” can be used to identify infected hosts.

Solution:

cVu is configured to alert if network traffic to “dark IPs” is detected. It can also be configured to selectively block the bad traffic if deemed harmful or capture it for further investigation and forensics.

### Request to Reply Ratios – Scanning for Anomalies

Healthy networks exhibit balanced behavior such as requests being matched by replies. For example, the number of ICMP echo requests should have a matching number of replies. Similarly, each ARP request should have a reply. Unbalanced behavior usually indicates host scans or network misconfiguration.

Solution:

cVu is configured to alert if the ICMP echo request/reply ratio or ARP query/response ratio deviates from a healthy level (ideally equal to one). Traffic from infected hosts can be selectively controlled to contain infections.

### Detecting Evasion – ICMP/SSH Encapsulation

A good example of a connection hiding technique is the Ping Tunnel (Ptunnel) open source utility, where TCP connections are tunneled over ICMP with encrypted payload (SSH) and appear as innocent ping packets. Users can use Ptunnel to send and receive unauthorized traffic that evades detection by firewalls or content inspection tools.

Solution:

cVu is configured to trigger on ICMP packets with payload that establishes a Ptunnel connection and to block such connection attempts.

### Application Traffic – “normal” vs. “others”

Traffic over TCP or UDP ports which are not used by standard applications might indicate port scanning or use of unauthorized applications.

Solution:

cVu is configured to alert if network traffic over non-standard ports exceeds some specified threshold. Traffic can be selectively blocked if deemed harmful or captured for further investigation and forensics.

### Keep Alive

Hosts that become inactive and stop sending traffic may indicate a server crash, security issue, or load balancer failure.

Solution:

cVu is configured to trigger if there is no network traffic from a host or set of hosts for some period of time. For example, if there is not at least one packet per  $n$  seconds from the host the administrator is alerted.

### **Virtual E-Patching of Servers**

Software applications need to be continuously patched against newly discovered vulnerabilities. Often servers can be patched only during pre-scheduled service intervals in order to minimize business disruptions. Until the right software patch can be verified and installed, a virtual network E-patch can prevent the particular vulnerability from spreading over the network.

Solution:

cVu is configured to block the SQL slammer (Sapphire) worm. On the fly payload inspection and pattern matching identify packets with the worm code and the “bad” packets are dropped to prevent propagation and protect vulnerable hosts until they can be patched.

### **Non-standard ports – Encapsulation Masquerading and Evasion**

Users can evade corporate firewall policies by using open ports such as 53 and 80 for “banned” applications (e.g. rogue mail server, file sharing, etc.). Deep packet inspection of the payload of every packet is required to detect such evasion techniques.

Solution:

cVu is configured to trigger if SMTP (send-mail) connections are made over a port that is not the standard TCP port 25.

### **Error Messages – Destination Unreachable**

Malicious port scans from outside or inside the firewall perimeter might be reconnaissance prior to an attack. Large numbers of “destination unreachable ICMP error messages” might indicate that a scan is in progress. When the number of destination unreachable error messages is “unusual”, it is indicative of potential issues.

Solution:

cVu is configured to trigger if the number of destination unreachable ICMP error packets exceeds some threshold. cVu can selectively duplicate those packets, allowing drill down and root cause analysis.

## **Summary**

cPacket brings granular network behavioral information and surgical response capabilities to the LAN. This document describes several cVu 1000 use cases for identifying and containing threats. With cVu, network managers spend less time on tedious reactive troubleshooting and more time on enhancing network performance and reliability.



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