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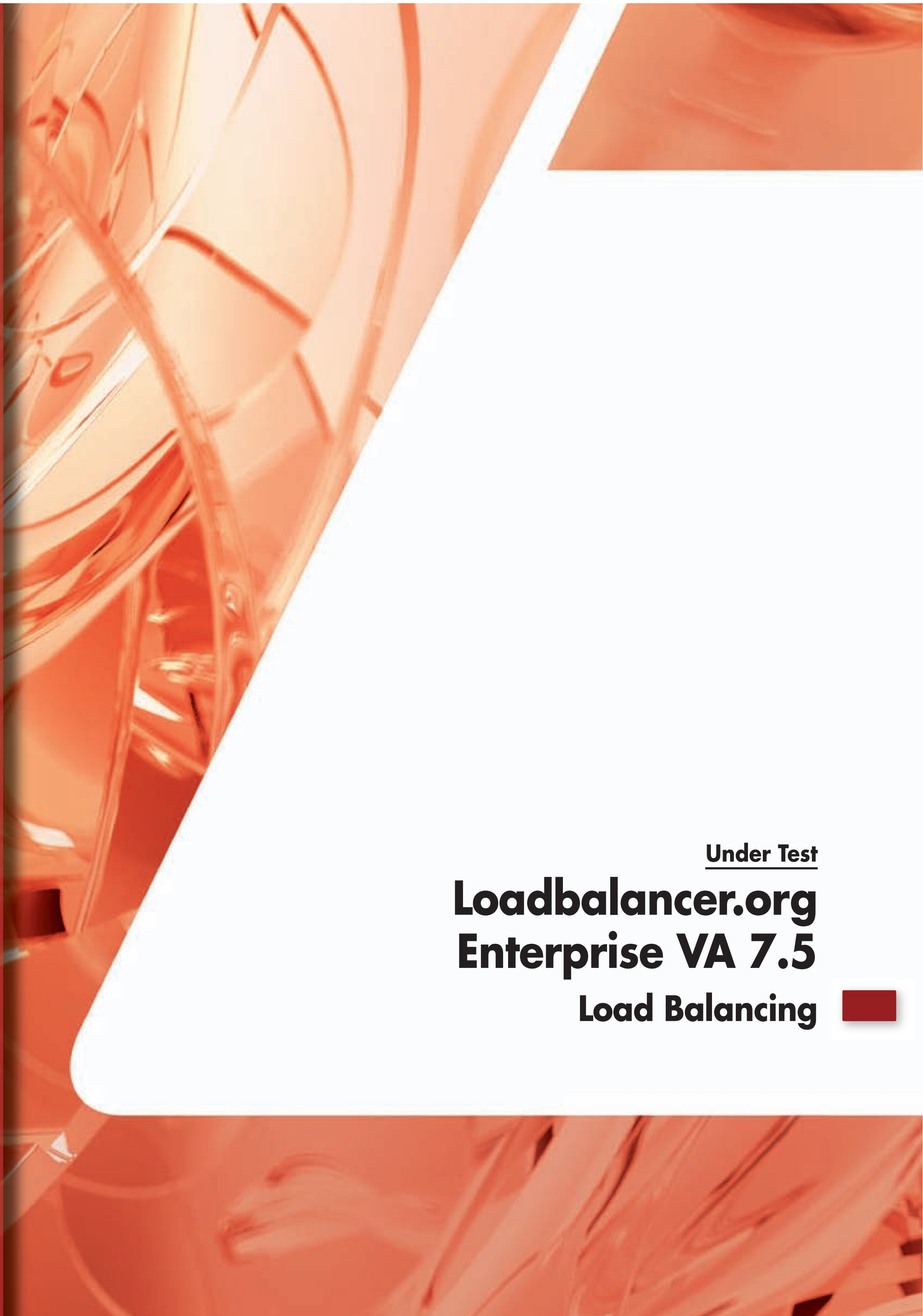


Under Test

Loadbalancer.org Enterprise VA 7.5

Load Balancing

Under Test: Loadbalancer.org Enterprise VA 7.5

Load Distribution

by Thomas Bär

Source: anatolymas - 123RF

There are many reasons for network load balancing. On the one hand, the system load on a server can be shared among different machines, while on the other hand, it is relatively uncomplicated to set up a reserve or backup system. Although the board resources from Microsoft include the required technology, the configuration is always restricted to the participating machines and different operating systems quickly lead to annoyance. This is where the load balancing solutions from Loadbalancer.org come into their own. The solutions are available as software or hardware appliances and allow simple configuration.

Network Load Balancing (NLB) is a variation of the cluster technology. While a genuine cluster refers to a group of independent computer systems that each execute the same applications and that present themselves to a client as a single system, NLB is a method for sharing all tasks for processing and for redistribution of the tasks in the event of failure of a node in the system group.

There is no absolute necessity for the systems to be completely identical in an NLB group. The NLB forwards service requests – for example, for web access, to the relevant systems, which then process the requests. In ideal cases, an NLB group automatically detects the failure of a node and transfers all new requests only to the remaining systems. NLB is basically suitable for web services, VPN services, streaming media, remote desktop services and proxy services.

NLB can be implemented using a wide range of technical approaches. However, all implementation methods have one thing in common: there is one shared, virtual network address (a so-called VIP, virtual IP), from where the NLB server transfers the incoming and outgoing network traffic specifically to the background servers. The different methods are based on the variety of requirements that they have to fulfill.

Lightning-fast Setup

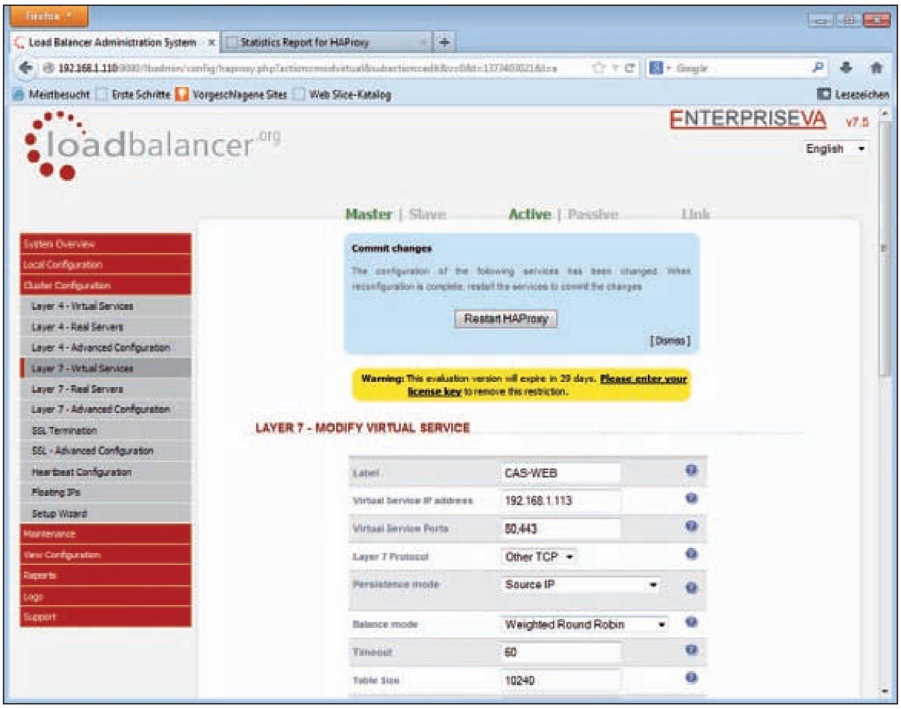
The Loadbalancer.org Enterprise Virtual Appliance 7.5 was installed and configured for the first time quickly and easily. We downloaded the 216-MB Zip archive provided for the 30-day trial period and installed the system once under VMware ESXi 5.1 and also as a virtual machine under VMware Workstation 9.0.1. Along with the VMware platform, the software also supports Microsoft Hyper-V and is available on a physical appliance in different expansion stages.

In the minimum configuration we selected, the NLB server required 1 GB of RAM, used a virtual CPU and had a virtual 8-GB SCSI hard disk for storing the configuration data, the CentOS-based operating system and the log information. The number of required IP addresses and virtual network cards increases, depending on what the target configuration is. We required only a single virtual network card with two assigned IP addresses, a VIP and a management IP in order to make our terminal servers, web servers and the Exchange environment suitable for NLB.

After importing the virtual appliance, the administrator needs only to switch on the VM, and in less than one minute he is requested to set up the basic configuration using the console window. Anyone willing to work with the standard IP address can immediately begin with the configuration in a web browser. However, it is very easy to change the IP address 192.168.2.21, particularly as the required user and password information is directly available in the console window.

Bare-bones User Interface

The menu on the Enterprise VA website did not particularly impress us, but it at least allows the user to switch language between English, German and French. The header bar offers the items "Master| Slave", "Active|Passive" and "Link." The



Commit changes

The configuration of the following services has been changed. When reconfiguration is complete, restart the services to commit the changes

Warning: This evaluation version will expire in 29 days. **Please enter your license key** to remove this restriction.

LAYER 7 - MODIFY VIRTUAL SERVICE

Label: CAS-WEB
Virtual Service IP address: 192.168.1.113
Virtual Service Ports: 80,443
Layer 7 Protocol: Other TCP
Persistence mode: Source IP
Balance mode: Weighted Round Robin
Timeout: 60
Table Size: 10240

Illustration 1: Enterprise VA NLB from Loadbalancer.org is fully configured with only a few mouseclicks. However, certain option parameters are not comprehensible without first referring to the documentation.

"Master" and "Active" settings were continuously displayed in green as we only worked with one NLB server and therefore could not switch to the second node. The main menu on the left includes areas such as "Overview", Local Configuration" and "Cluster Configuration."

Even on the main page, the administrator can view a graphical presentation of the bandwidth usage, the system load and the amount of RAM still available for use. Much more important than this, though – and users cannot see it at this time as no NLB cluster has yet been configured – is the key view of the NLB groups. This view presents the key fundamental data of the involved servers, ports and virtual IP addresses against a colored background whose meaning is self-evident. If everything is functioning properly, the frame around the information and the filling are shown in green, while yellow indicates the need for administrative intervention, and red signals the failure of all relevant components.

The local configuration options are restricted to mandatory parameters, such as the assignment of a host name, definition of the role that the administrator can define to be "master" or "slave", and the DNS settings. The four NICs assigned to the virtual appliance can each be associated with a VLAN using the Network Interface Configuration. In environments with stricter security requirements, it is recommendable to link two Ethernet adapters together as a "bond" in each case. The administrator can carry out routing at the web interface and does not have to switch to the console to do so. The administrator can also enter individual commands at the web interface for direct transfer to the shell. The software also displays the result – for ifconfig, for example – at the web interface.

Complex Exchange OWA Load Balancing

While installation and initial configuration only take a few minutes, configuration of the NLB was rather more complicated. Fortunately, the vendor provides the appropriate documentation in the form PDF files for the varied range of scenarios, such as web, Exchange and terminal services. These files can be downloaded from the vendor's homepage. It may well be the case that an administrator, who works on a daily basis with NLBs, knows all parameters in detail. We, however, were grateful for the documentation when getting to know the system.

Our aim was to achieve two identically configured Microsoft Exchange 2010 servers from the predefined "Contoso" series in the NLB group using Outlook Web App (OWA) and to access the machines with Microsoft Outlook. In a real environment, the NLB service would be applied exclusively to the servers that have the role of Client Access Servers. The servers process all Exchange client data traffic, including OWA, ActiveSync, IMAP4, POP3, RPC/MAPI and Outlook

Direct Routing (DR)

An NLB method based on layer 4 of the OSI reference model with very high performance in a frequently used procedure in which the NLB server modifies the destination MAC address of the data stream during active operation. All participating servers expect to directly occupy the virtual IP address of the NLB (the VIP). Although the servers are permitted to and must actually respond via the VIP, this is not the case for ARP requests. The direct routing mode allows servers in an associated network to access the VIPs or RIPs (real IP addresses). No additional subnets or routes are needed in the network, which makes setup easier. According to the vendor, Loadbalancer.org, the direct routing mode for HTTP requests is eight times faster than NAT, and in the case of terminal services, the speed advantage over NAT is even a factor of 50 greater.

Network Address Translation (NAT)

If DR cannot be used, NAT (also a layer 4 service), is the next fastest option for load balancing. The DR mode cannot be used if applications cannot respond to the two required IP addresses (RIP and VIP). The setup in the NAT alternative resembles for the most part that of a firewall environment. As a result, extensive changes in the configuration are needed for this alternative.

Virtual Server via IP Tunneling (TUN)

The "IP Encapsulation" is also found on layer 4. It is technical similar to direct routing, except that an encapsulated IP tunnel is used.

SSL Termination

SSL Termination refers to the ability of the load balancer to search for session cookies in an HTTPS data stream on layer 7 of the OSI reference model. To this end, the system must be able to decode the data traffic during active operation.

Source Network Address Translation (SNAT)

The HA proxy method implemented on layer 7 allows the correct use of cookies for the assignment of RDP, session broker or SSL accesses. The advantage of this alternative is that the configuration of the applications and servers does not have to be altered. In terms of speed, according to the vendor Loadbalancer.org, this method is slower than layer-4 NLB functionality.

Supported Types of Load Balancing

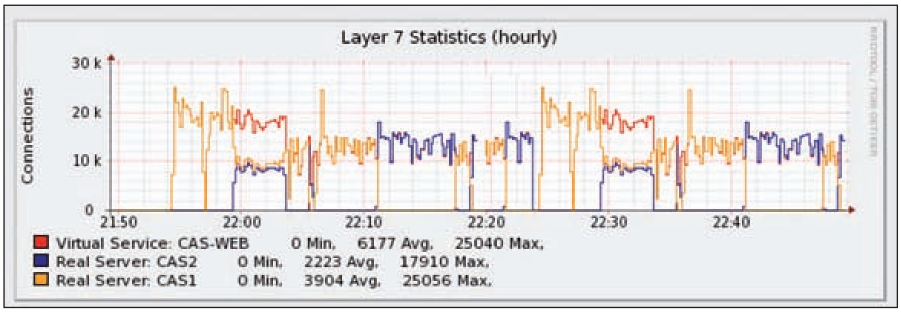


Illustration 2: The load balancing between the servers can best be viewed graphically with a time axis.

Anywhere, in the CAS role. The entire internal data traffic in an Exchange 2010 environment is handled by the Hub Transport Servers, which share the load independently by default.

Using the English version of the PDF manual, we began with the installation of a Source Network Address Translation HA-Proxy (SNAT). More or less twenty pages dealt with setting parameters and configuring settings. While configuration of the CAS-VIP bond on the Exchange server is, of course, one of the work steps to be expected, the manual modification of registry values could be considered to be a task more suited to an installation agent. The registry values ensure that the address book and the RPC service do not communicate through just any ports, but instead exclusively through the ports 60.200 and 60.201. Also other parameters, such as the value of 3,600,000 for client and server timeouts, should be defined either by a wizard that assists an administrator during the Exchange NLB installation or at least given in a more user-friendly unit (milliseconds in this case). Interestingly, three pages later, the software again demands the input of an hour, but this time in minute format.

In summary, the administrator sets up two layer-7 services for the Exchange NLB: one service is for ports 80 and 443, the other service responds to the specific ports for Outlook. The administrator assigns the physical machines to the two services in a second step. As is typical for NLB, the relative weighting to the other NLB servers can be specified using the "Weight" entry. For example, if one of the servers provides less performance than the others, the administrator could use the weight entry to ensure that the machine is considered less frequently during the assignment of sessions. In general, the vendor – who refers in this case to Microsoft – recommends assignment by "weighted round robin" as the most suitable method. There is no dynamic assignment in accordance with the current memory or CPU load on the target server. In this case, the NLB would have to sample the data on the Windows servers by WMI.

Reliable Load Balancing

After about 90 minutes, we were able to directly test our configuration. As could be expected, the NLB server set up a connection to one server at a time. As no measurable difference could otherwise be seen, we then attempted to disrupt the assignment by disabling a server. Within a few seconds, the load balancer detected the failure of the node and directed all new requests to the remaining servers. If the two servers failed, the NLB server could only present a local failover website, whose visual display and contents the administrator can modify for his or her company.

In another step, we used a test program to set up a very large number of very fast HTTP connections at the same time through the load balancer to the IIS web services of the Exchange servers. The load was, as expected, shared equally between the systems. If one of the servers is stopped, a message was displayed for about five seconds to indicate that the destination could not be reached, before the load balancer switched to the other system. Regarded overall, the NLB server could not be disrupted in implementing its tasks. We experienced similarly positive results in the case of remote desktop access.

Since there are plenty of constellations in which an NLB group server member is to be shut down, the "heavy-handed" method does not need to be used every time. The Drain command on the menu bar of the load balancer is very practical in this regard. Along with the Halt command, which immediately ends all connections to the selected server, Drain has the effect that the machine deals with all connections that are still open. Since the load balancer does not initiate any further connections in this status, the server can calmly process the existing tasks.

Product

Load balancer in the form of a software or hardware appliance.

Vendor

Loadbalancer.org GmbH
www.Loadbalancer.org

Price

The smallest model of the virtual appliance, Enterprise VA R16, limited to 16 servers, costs 1,195 euro. The price of the unlimited virtual appliance starts at 2,995 euro as an individual system and 4,995 euro for a double set.

Technical data

www.it-administrator.de/downloads/datenblaetter

***IT Administrator's rating** (max. 10 points)*

Configuration work	7
Load balancing alternatives	8
Administrability	7
Operating reliability	8
Documentation	8

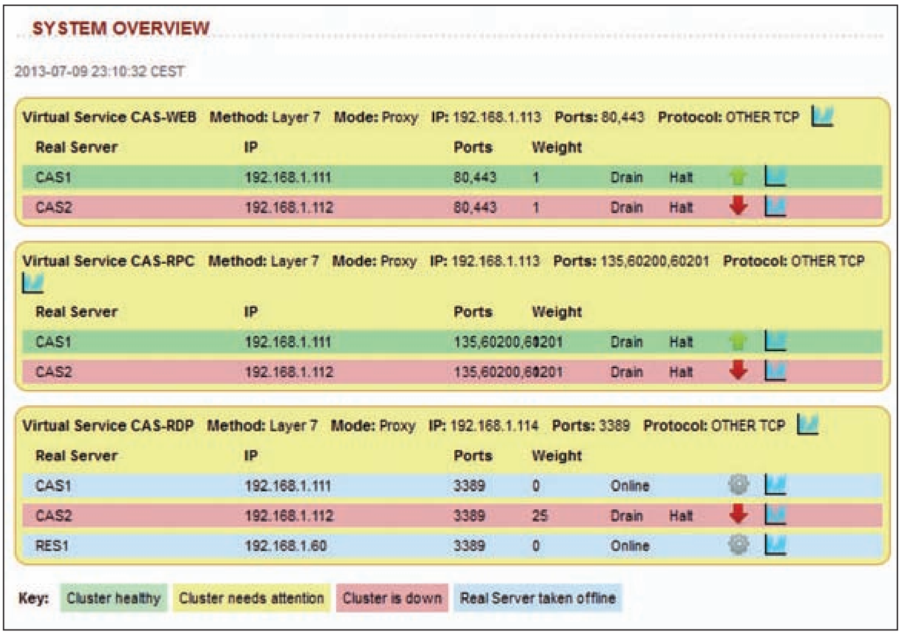
This product is

very suitable for companies wishing to run different systems using load balancing.

conditionally suitable for companies that already use other NLB methods.

not suitable for companies that only have individual servers and do not require load balancing.

Loadbalancer.org Enterprise VA 7.5



SYSTEM OVERVIEW

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Virtual Service CAS-WEB **Method:** Layer 7 **Mode:** Proxy **IP:** 192.168.1.113 **Ports:** 80,443 **Protocol:** OTHER TCP

Real Server	IP	Ports	Weight			
CAS1	192.168.1.111	80,443	1	Drain	Halt	↑
CAS2	192.168.1.112	80,443	1	Drain	Halt	↓

Virtual Service CAS-RPC **Method:** Layer 7 **Mode:** Proxy **IP:** 192.168.1.113 **Ports:** 135,60200,60201 **Protocol:** OTHER TCP

Real Server	IP	Ports	Weight			
CAS1	192.168.1.111	135,60200,60201		Drain	Halt	↑
CAS2	192.168.1.112	135,60200,60201		Drain	Halt	↓

Virtual Service CAS-RDP **Method:** Layer 7 **Mode:** Proxy **IP:** 192.168.1.114 **Ports:** 3389 **Protocol:** OTHER TCP

Real Server	IP	Ports	Weight			
CAS1	192.168.1.111	3389	0	Online		⚙
CAS2	192.168.1.112	3389	25	Drain	Halt	↓
RES1	192.168.1.60	3389	0	Online		⚙

Key: Cluster healthy | Cluster needs attention | Cluster is down | Real Server taken offline

Illustration 3: An overview shows in color the situation regarding the clusters and servers

Unclear Log Files

We were very impressed by the option to directly view configuration files on the web interface. This option means there is no need to switch to the console. The administrator can access the integrated firewall using scripts and also directly from the web interface. Backup and restore functions for manual backup are available as is synchronization with a peer partner. Although the log files, if activated by the administrator, provide important information – for example, on timestamps, the source IP address with port and the destination of the connection – at least color highlighting of the different defined virtual services or even a filter function would have been very helpful instead of endless linking of the rows together. Apart from transfer of the messages to a Syslog server, there are no other utilities.

Summary

Anyone who has ever had to work frustratingly for several hours with the NLB services from Microsoft will like the alternative offered by Loadbalancer.org. We were able within two hours of the test to set up and configure a load balancer for Microsoft Exchange 2010 OWA. The system gives the user an easy introduction to the subject and is sparing on details. Within a very short period of time, we had our first remote desktop NLB or HTTP-NLB set up without having to change anything in the existing configuration. On the one hand, that is pleasing, while on the other hand, it is very useful for operational security in the company. Only a small number of weaknesses in the configuration procedure lead to occasional annoyance and make the administrator's work unnecessarily more difficult. *(dr)*