



radware

LinkProof

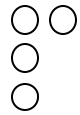
Frequently Asked Questions

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Q: What is multi-homing and why do I need it?

When providing an online service, it is important to always have access to the Internet. You cannot limit yourself to choosing one provider and being at their mercy. They may fail or you may overload the circuit with peak traffic during the day, resulting in slower network speed. Unavailability when a site is down and slow connections can cause clients to go elsewhere, perhaps to your competition for better service.

Many sites are turning to the multi-homed scenario; having multiple connections to the Internet via multiple providers to provide a reliable and high throughput service. Multi-homed networks are increasing in popularity because they provide networks with better reliability and performance to the end-user. Better reliability results from the fact that the network is protected in case one of the Internet links or access routers fails. Performance increases due to the fact that the network's bandwidth to the Internet is the sum of the different pipes available through the different access links.

Q: Do companies fail due to ISP problems?

A recent study done indicates that it happens relatively often:

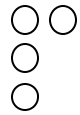
- 61% list service provider problems as top cause of downtime and degradation.
- Average loss of \$3.6 million in productivity
- Average loss of \$4.2 million in lost revenue opportunities

Q: What traditional complications are there with multi-homing?

Several complications are introduced with a network design that includes multiple connections to the Internet. The first and foremost are complications in the IP addressing scheme that result from the two common IP schemes deployed in multi-homed sites:

1. A single IP network number is assigned to the internal network. This requires communication and cooperation between the various ISPs in order to advertise proper routes for this single IP network to the rest of the Internet.
2. Each ISP assigns the internal network a different IP address range. Therefore, multiple IP ranges will be simultaneously active for the internal network.
3. A third possibility is to maintain a single IP network. With appropriate peering arrangements, this process can be managed using BGP.

Each of the above schemes presents a unique set of challenges. In the first case, when a single IP address is used, the ISPs must coordinate and work together to advertise a proper route for the single subnet to the rest of the Internet. Also, care must be taken to ensure that all links are used for incoming traffic. If only one ISP is used to deliver inbound traffic to the network, then a major part of the motivation for, and benefits of, multi-homing will not be realized.



In the second case, where distinct IP ranges from each ISP are assigned to the internal network, there is an issue of which range to use for outbound traffic. Furthermore, if only that range is used, a second ISP link will never be used for inbound traffic, again since the world knows the range as accessible via the first ISP.

In the third case, BGP is oblivious to “fastest route measurements”, rather it routes traffic according to autonomous system hops. 50% of the routing decisions made by BGP are sub-optimal from a traffic management perspective. Furthermore, BGP is cumbersome and costly both from an implementation and ongoing maintenance standpoint.

Q: What is the purpose of LinkProof?

The purpose of LinkProof is to intelligently load balance and select the best ISP link that will give users the fastest access to their data across the Internet. By providing multi-homing capability, LinkProof eliminates the problem of a single point of failure, which can happen when using only one ISP. Using multiple ISPs adds consistent service, reliability, and provides for fault tolerance.

Radware's LinkProof eliminates all of the complexities of multi-homing design, providing a single, easy to manage appliance that intelligently utilizes all Internet links optimally. LinkProof also maximizes the benefits of multi-homed networks that are never fully taken advantage of.

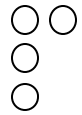
Q: What advantages does LinkProof bring to the table?

LinkProof provides the following advantages for multi-homed environment:

- High Availability to eliminate degradation of service and downtime
- Optimization of resources resulting in better QoS and user experience.
- Lowers telecom costs. Not only does less future bandwidth need to be provisioned but optimization of current bandwidth is maintained.
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Q: What basic feature benefits of LinkProof?

- LinkProof intelligently manages the IP address ranges assigned to the network from various ISPs.
- LinkProof ensures that all ISP links are used by intelligently load balancing all incoming and outgoing traffic via the available links, while simultaneously managing the address spaces used for outgoing traffic.
- LinkProof's proximity detection capabilities can also be used to ensure that the optimal path is used for both inbound and outbound traffic.
- LinkProof uses the optimal link and maximizes the investment in your links.



Q: How is LinkProof able to track outbound traffic between multiple ISPs?

For intelligent address management of outbound traffic, LinkProof utilizes an algorithm called SmartNAT. The problem with simple NAT (Network Address Translation) is that it can cause return delivery issues. To alleviate this problem, LinkProof will perform "smart" dynamic NAT. With this feature, LinkProof will have addresses from both ISPs' address ranges available for translation. Then, when a router is selected to carry an outbound session, LinkProof will choose an IP address that is associated with that router/ISP. By choosing translated source IP addresses according to the chosen router, return delivery issues are not encountered.

Q: How Does LinkProof optimize performance of outgoing traffic?

In order to optimize outbound traffic, LinkProof can perform Optimal Content Routing to optionally perform proximity calculations for outbound traffic. If an internal host wants to access a specific web site, it's possible that the route through one ISP is more efficient than the route through the other ISP for that specific content. So, LinkProof performs proximity calculations through all available paths to the destination. For future traffic to this destination, LinkProof will choose the best ISP connection, according to the results derived from these proximity calculations.

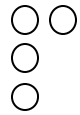
To achieve this, LinkProof will utilize Radware's already proven (patent pending) proximity algorithms to efficiently and dynamically calculate the best ISP link per destination. This dynamic calculation optimizes all available ISP links in ways that were never before exercised.

Combining proximity and load balancing assures that ISP links are always optimized, according to traditional load measurements and destination resource based routing decisions.

Q: How does LinkProof optimize inbound traffic?

SmartNAT not only encompasses dynamic IP address allocation and translation, but it also includes the ability to statically map internal resources to external IP addresses. Individual internal resources (such as servers) are mapped to multiple outside IP addresses (one from each ISP). Statically mapped IP addresses are used for inbound traffic, from the most available ISP link.

The static mapping of SmartNAT also compensates transparently for ISP link failure. If an ISP link is down, only available IP addresses are used for inbound traffic. By making an inside resource available through all available ISPs, uptime is guaranteed for that internal resource. Permanent access to the resource is available through the most available ISP.



The administrator can select the type of checks used for inbound proximity in order to find the best link. For inbound traffic, LinkProof utilizes the same proximity mechanisms that it uses for outbound traffic. The reason proximity is an issue for inbound traffic is once again a matter of optimization. If an Internet host needs to access an internal server, then it's likely that this Internet host can get to the multi-homed network more efficiently through one ISP versus the other.

Q: How can LinkProof guarantee bandwidth to critical applications?

A: With SynApps' Bandwidth Management network administrators may set the upper and lower bandwidth allocation limited for class of user, destination of traffic or type of traffic. Queuing and a variety of dispatch methods ensure that no class of traffic gets "starved". Bandwidth borrowing also enables unused bandwidth from idle queues to be "borrowed" to ensure QoS for all traffic.

Q: How does LinkProof determine the best route to take?

Real-time link load - LinkProof calculates the load on each link, in real-time, and sends the traffic to the least loaded link.

Link Latency - LinkProof sends a number of ping packets, TCP packets and UDP packets to the destination across all ISP links in order to measure the time delay. The reply packet, when it comes back from the destination, will contain the hop count and the round-trip delay (measured in milliseconds). LinkProof will then select the link that has the quickest response, thereby improving the performance to the client

Link Availability - LinkProof checks different points on the data path (such as routers, servers, switches) to see if they are up and responding normally. If no reply is received from these devices, the path is considered unavailable. LinkProof then channels the traffic to the other remaining links.

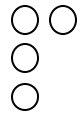
Link Bandwidth Limit - LinkProof allows each link to be configured with its own outbound bandwidth limit. When any limit is reached for a link, traffic is redirected to other links.

Link Weights - Each link can be assigned a weight, which influences LinkProof's load balancing decision. Weights can be used for higher capacity links to increase their traffic and to mark expensive links, reducing their traffic.

Policy Enforcement - Specific policies set forth by the network administrator or enforced. They may be changed at any time, on the fly.

Q: What are LinkProof's leading advantages?

- LinkProof is the sole product on the market today that has been on the market for over two years and over 1,600 installations at some of the busiest and most prestigious sites in the world. It is the only product that effectively provides load balancing and high availability for both inbound and outbound traffic, specifically for multiple WAN or ISP connections.



- Actively use all links that you have purchased instead of having one as primary and one as a backup.
- LinkProof enables load balancing between Internet service providers (ISPs) without the need to coordinate between them.
- LinkProof ensures the fastest content delivery for end-users measuring responses as a function of time and not geography.
- LinkProof provides cost savings on telecom costs by optimizing link use and avoiding bursting.
- LinkProof ensures high availability between Internet service providers. It checks whether a link is healthy before sending users through it. (Up to 10 different IP addresses are checked on each path)
- LinkProof plugs directly into a network switch or a hub for best performance and eliminates the need for network reconfiguration. Its dimensions small and the device is, solid-state hardware without any moving parts.
- When using two LinkProof devices, a single point of is eliminated.
- Added layer of security that eliminates common attack signatures at the edge.
- LinkProof eliminates the need to implement Border Gateway Protocol (BGP). BGP offers high availability but does not offer true load balancing capability. 50% of the decisions BGP makes are sub-optimal from a load-balancing standpoint. In addition, it is difficult to set up and is expensive to maintain.

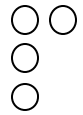
Q: Who can benefit from installing LinkProof?

1. Corporate - Enterprise - Any organization that relies on the Internet as a business resource, and uses more than one ISP to ensure non-stop access to the Internet, can benefit using LinkProof. Companies that have multiple WAN connections between offices and use IP applications on top of those WAN connections can use LinkProof to achieve redundancy and optimization.

2. e-commerce and online services - For the same reasons online businesses cannot afford a server failure to be detected by the end-user, they cannot afford for their links to be unavailable at any time. Thus LinkProof provides the certainty of having an available link to the Internet, as well as optimizing the use of those links at all times.

3. Small and medium sized ISPs - Most companies with Internet access use one ISP. This provider is often selected to answer the growing bandwidth needs of the company. In choosing the same provider again and again, companies often pass up significant benefits associated with a second access provider. The benefits include:

- Continuous connection - Eliminates a single point of failure associated with one access provider.
- Improved Quality of Service (QoS) - Different ISPs provide better response times depending on the requested content, time of day and connectivity between sites
- Economic benefits of competitive service providers



Q: How can LinkProof help me save costs?

- Elimination of downtime costs
- Through optimization of all links, a savings of 30% of bandwidth can be achieved
- To avoid single-link risks, organizations install an additional ISP link as a backup. However, this line is not utilized and is a wasted resource. Using LinkProof allows this link to be used on a continuous basis.
- Organizations are concerned about guaranteeing Quality of Service (QoS) and access to critical applications. By adding LinkProof, ISP links are balanced and optimized. Furthermore, scaling up and adding bandwidth can be done in an easy and cost efficient manner, saving costs on bandwidth purchases.
- Each ISP link has a bandwidth limitation. When bursting is available, using more than this limitation causes organizations to pay dearly. Sometimes the costs can translate to several times the cost of the original provisioned link. LinkProof assures that administration configured policies are adhered to, resulting in greatly reduced telecom costs.
- In comparison to using LinkProof, Border Gateway Protocol (BGP) is another way to implement multi-homing. LinkProof's operation expenses are significantly lower than BGP. Moreover, in addition to the cost savings achieved through optimization, LinkProof provides bi-directional intelligent application switching in addition to other key benefits at a lower cost.