

Elfiq Link Balancers

A practical Q&A overview
of link balancers for
the healthcare sector



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1. Business needs in the healthcare sector

Technological advances in the healthcare sector in the past few years have provided innovative new ways of doing business on both the operational and medical sides of the business. Applications like patient healthcare record access, insurance claim management, remote medical procedures and many more share one common element crucial to their success: access to the Internet. Carrier link failures and saturation will critically impair the ability of any health-focused organization's ability to operate and communicate and thus perform its core functions.

HIPAA security rule 164.308(a)(7)(i) identifies contingency planning as a standard under Administrative Safeguards. The primary objective is to reduce the level of risk and cost to you and the impact on your staff, customers and business associates.

HIPAA Security Rule 164.308(a)(7)(ii)(B) and 164.308(a)(7)(ii)(C) respectively outlines measures and expectations with regard to disaster recovery and emergency planning. These topics are covered in this document from a carrier and network availability perspective.

Finally, the past few years have stressed the need for a strong infrastructure to handle pandemic outbreaks such as SARS and the AH1N1 virus. The consequence of such outbreaks will mean a lot of healthcare knowledge workers operating from remote offices or their homes, thus taxing existing infrastructures, specifically remote access, Web applications and VPNs.



2. Link Balancer Overview and Basics

What is a link balancer?

A link balancer is a network device that enables the use of multiple concurrent Internet and private WAN links or data circuits for increased Internet access performance for telecommunications resources and redundancy should a link fail.

Is this a software or hardware product?

A link balancer is an all-inclusive appliance-based product, which means it runs its own proprietary software on a specific hardware device, simplifying use, management and maintenance.

How can such a product help deliver Internet access?

A link balancer will enable significant benefits for any healthcare provider, including:

- **“Always-on” Internet access:** This ensures that Internet access and related services/servers are always available by enabling the use of multiple concurrent ISPs with different access technologies. By combining “telco” links (DSL, T1, etc.), cable modems, microwave, alternative fiber links and more, connectivity is not dependent on a single technology provider, thus eliminating a strategic point of failure.
- **Bandwidth additions:** Link balancers enable the use of multiple concurrent Internet and private WAN links so more can be added to the existing infrastructure easily and securely as demand grows.

- **Bandwidth management:** Link balancers are able to direct traffic types to certain links based on availability and strategy. A cable modem is a preferred type of link for Web surfing since it provides great download speeds, while symmetrical links like T1s are better suited to upstream applications like file transfers and online course delivery.

Most link balancers also enable “Quality of Service” to promote or demote traffic based on customer-defined criteria, so key applications have the required bandwidth and less useful traffic is properly limited.

- **Cost reduction:** Link balancers enable the use of any IP ISP link available on the market, including low-cost ones like DSL and cable modems. Many organizations have reduced their dependency on expensive links and added low-cost alternatives, providing a significant increase in download speed and substantial savings in the thousands of dollars per month. This approach also enables a quick cost-justification scenario to implement such products, where the link balancer project will cost much less than the previously used bandwidth on an annual basis.

Which services or applications can benefit from a link balancer?

Any service or application using Internet access can benefit from a link balancer, such as Web surfing, email, email servers, online patient record applications, Web servers, VPN access, online medical systems, online course delivery systems and much more.

The healthcare sector is strategically dependent on accessing vital online resources such as email, government databases, patient-related information, insurance resources and many more. Lack of access may result in rapid financial and productivity losses.

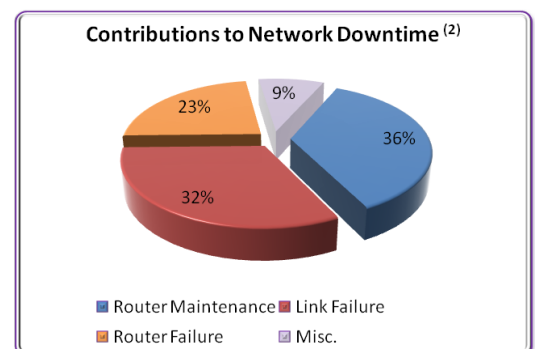
Should these resources not be available for an extended period of time (more than 4 hours), the consequences on strategic activities such as remote medical procedures and insurance document processing may hamper the facility’s ability to deliver core services and subject it to fines and penalties.

Average hard downtime per month ⁽¹⁾	
Average hard downtime per month	1.7 outages
Average duration per hard downtime	67 minutes
Average total hard downtime per year	23 hours
Average percent of employees affected	28% of employees

What are the cost savings and ROI associated with such products and strategies?

Beyond using lower-cost ISP links for normal operations, the healthcare sector is a service-based market space which depends on individuals or groups delivering results based on expertise. When these resources are not able to perform their tasks normally due to lack of telecommunications resources, productivity is dramatically impaired, and the organization in some contexts may be liable for not being able to deliver within a specified timeframe.

As an example, nurses and doctors continually manage strategic patient timelines, and should they not be able to deliver the expected results to the patient, severe consequences may result, such as medical complications, regulatory issues and insurance transaction complications.



Many healthcare providers host customer-based applications at their sites to manage profiles, active projects, billing and accounting and much more. Outages will negatively impact these operations and may cause an increased number of helpdesk calls.

To calculate the cost of an Internet-based outage, this return on investment (ROI) equation provides guidelines:

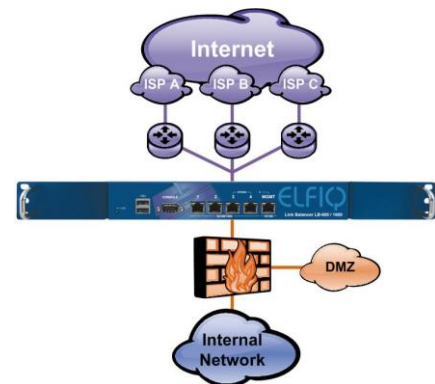
Cost analysis – billing capabilities	Value or calculation
A- Number of hours of downtime per month	
B- Average time spent per hour per person	
C- Average hourly rate for partners	
D- Average hourly rate for professionals (non-partner)	
E- Average hourly salary per administrative resource	
F- Cost of litigation and penalties	
G- Calculating yearly cost of downtime	$12 * A * B * (C+D+E+F)$
Equipment, maintenance and installation costs year 1	
Cost of downtime – equipment cost above = year 1 savings	
Cost of downtime – maintenance cost – year 2 and beyond savings	

Where do you install it on the network?

The link balancer should typically be positioned between the routers connected to it and the firewall. Some organizations employ different strategies based on the methodology used to manage private WAN links.

What kinds of ISP links can Elfiq's link balancer products manage?

Elfiq link balancers can handle almost any kind of ISP link (public or private), and customers can mix and match link technologies as they see fit. Commonly used links in the healthcare vertical include DSL, T1s, DS3s, cable modems, fiber, fixed wireless and many more. For example, a site could have a T1 circuit with two DSL links and a cable modem, and the Elfiq product would balance the traffic on all links based on policies defined by the customer. Customers must plan the IP addressing they will need prior to installing a link balancer; please contact Elfiq for further information. Organizations planning to implement link balancers are encouraged to contact Elfiq to discuss which bandwidth options are the best and/or most cost-effective for a specific location.



Can I use mobile links in case all wired links fail?

Yes, the Elfiq unit will handle wireless links such as 3G mobile and WiMAX. Fixed wireless links are growing in popularity as well and may be used too.

How does a link balancer compare to a router?

A link balancer is very different from a router—routers are primarily designed to provide the gateway to the carrier's network. A link balancer is designed to use multiple routers concurrently for incremental benefits such as increased performance, network redundancy, data traffic management and more.

Who are these products designed for?

Elfiq's product line is the broadest in the industry, offering entry-level products for smaller healthcare facilities to world-class data center products for the larger organizations, which can support large meeting and conference centers or convention centers. This breadth of products allows Elfiq to accommodate your organization. Elfiq's link balancers can help ensure Internet access performance and prevent Internet access outages.

How much do these products cost and where can I purchase one?

For pricing and availability information, please contact info@elfiq.com. Elfiq will consult with the customer to define the needs and recommend the best sized unit to serve those needs. Again, Elfiq provides the ability to scale cost-effectively as bandwidth needs grow.

How is this product sold – is it by user?

Elfiq's products are sold per link balancer unit, not by employee/PC/server/user.

We do not have IT staff on site to deploy these units, what can we do?

Elfiq's professional services and Elfiq's partners can assist with local or remote deployment of these units. The process has been completed successfully for many customers without IT staff involved.

3. Customer References – Who Uses Elfiq Products

How long has Elfiq been servicing the healthcare sector?

Elfiq has been servicing this market since 2007 and has built up expertise to deliver these projects seamlessly through a detailed methodology including a thorough analysis phase, installation procedures and business-specific configurations.

What types of customers use Elfiq products?

Elfiq's customers range from single-unit organizations to complex multi-site deployments involving VPN resilience and geographic bandwidth balancing across multiple data centers for internal applications and external customers.

What are customers saying?

Here are quotes from some Elfiq customers in this and similar business sectors:

MedRiskNet

"As a leading healthcare claims management organization, we rely on internet access to deliver quality healthcare services. We brought Elfiq link balancers into our environment to proactively manage bandwidth and ISP carriers for our outbound internet traffic and gained valuable increased throughput in the process. We are very happy with the result and plan on acquiring more units in the future."

*Jeffrey Ericson Manager
Data Analytics and Infrastructure*

Club Quarters

“We selected Elfiq of out a list of six potential vendors, after testing multiple vendor devices” said Bill Mellott Director IT Development and Implementation of Club Quarters located in New York, USA “Elfiq is the vendor who was able offer the breadth of features our organization required. Their preconfiguration services enabled quick installation and uptime, with in minutes of site installation. Their support team deserves to be congratulated for the quality of the services and organization they rendered.”

*Bill Mellott
Director IT Development and Implementation*

4. Overview of Elfiq Link Balancer Features – Healthcare Vertical

1. Basic Operations

Will all my ISP links be used concurrently?

Yes, all ISP links will be used concurrently to provide maximum results for Internet access.

What happens when a link fails?

We at Elfiq understand that “mission critical” takes on a whole new meaning in the medical sector and have designed our architecture with business continuity in mind. When a link fails, the Elfiq Link Balancer will sense that it is no longer able to send and receive data and stop using it until it is available again. During a link outage, the Elfiq unit will redistribute traffic on the other available link(s) with the selected algorithms.

Will someone be notified if a link goes down?

Yes, the Elfiq unit will be able to email pertinent information on link availability when one fails or returns to normal operations.

Even without IT staff at the location, can this product be updated or reconfigured?

Yes, through remote access over the Internet, and through Elfiq’s innovative USB technology. A local configuration can be done using a standard USB flash memory key to store the configuration file. For this operation to be performed, the balancer must be turned off prior to inserting the USB key into the balancer and then powering it on. The Elfiq unit will perform the reconfiguration without any other intervention.



USB Configuration

What happens if the unit loses power?

In this case, the unit will no longer process data with the balancing features, but it will not stop the traffic completely. The LAN Failsafe feature is unique to Elfiq Networks in the link balancing product segment, where a link designated as the primary link and the gateway device attached to it will continue to process traffic in “pass-through” mode.



LAN Failsafe

1U rack mountable units are available in failover kits. This type of configuration is highly recommended and required where constant Internet access and a larger number of users are involved.



High Availability

Can I get reports of the traffic for my WAN network?

Yes, the Elfiq unit's Web management interface will enable telecom and network operators to view link availability, usage and other metrics.



2. Advanced Balancing Features

How many algorithms can the Elfiq products use for regular balancing?

The Elfiq units utilize seven techniques to proactively balance traffic.

Can I prevent employees or applications from utilizing all the bandwidth?

Yes, the Elfiq units enable this type of management with two key features:

- Traffic segmentation:** Establishments can select on which links certain traffic types will be able to flow through to ensure that key applications like Web surfing, VPNs and email have priority.
- Quality of Service:** QoS can promote or limit certain types of bandwidth, making sure that resource-intensive users do not use all the available bandwidth. For example, on the primary T1 link on a site, 50% of the bandwidth could be reserved for VPN access and the balance reserved for other types of data traffic like Web surfing.



Traffic Segmentation

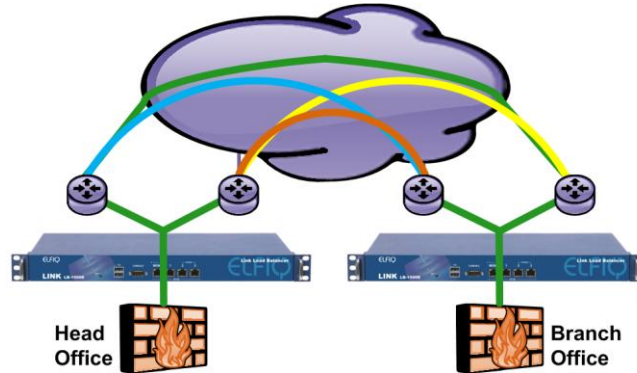


Quality of Service

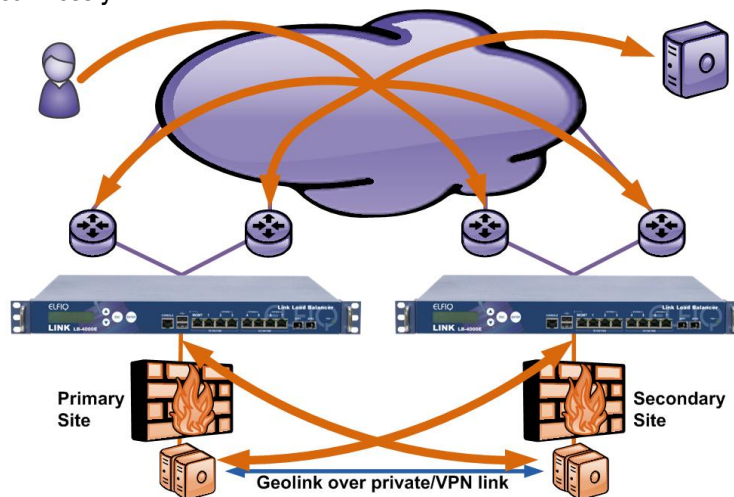
Can I ensure office to office or critical resource communications are not interrupted?

Elfiq's products offer advanced features to ensure maximum uptime for multi-site deployments:

- 1- In the case of point to point applications such as VPNs and VoIP, Elfiq offers the SitePathMTPX feature, which enables bandwidth virtualization between two points or more. By using an Elfiq unit at each end, a new level of performance can be achieved using all links on each end concurrently. Should a link fail, the SitePathMTPX will simply redirect the traffic between both endpoints without cancelling any VPN tunnels or traffic.



- 2- When organizations have to handle multiple data centers and require constant access to internal or external resources, the optional Geolink feature is able to redirect incoming or internal traffic between multiple geographically distinct sites to ensure maximum business continuity. Should a site not be responsive, internal users and customers are able to access business resources until the issues are resolved seamlessly.



5. Planning an Elfiq Implementation for Your Network

Before I start this process, is there help available?

Yes, the Elfiq professional services team and the Elfiq business partner network can assist in preparing a deployment should your organization not have the resources available. Elfiq also offers a remote deployment program.

What steps should I expect in the process using professional services for remote deployment?

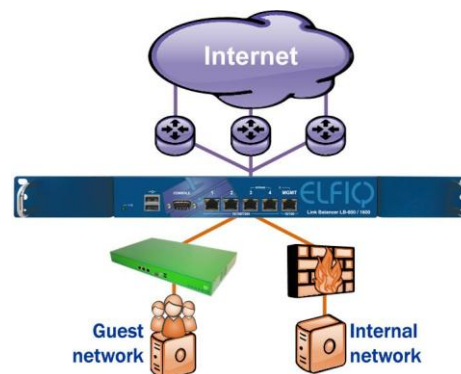
An organization should expect the following process to happen to deploy an Elfiq unit:

- 1- **Information gathering:** The information for each ISP link and internal gateway and/or firewall will be necessary, along with the information on all the services to be balanced. Elfiq can supply a Microsoft Excel template for easy information gathering. To get a copy please contact support@elfiq.com.
- 2- **Preparation and shipment:** The Elfiq team or the business partner will pre-configure the unit prior to shipping to facilitate the installation process.
- 3- **When the unit is received,** a contact person will be needed to complete the process at the installation site by simply connecting the cables to the proper devices. Most physical installations are completed in less than ten minutes.
- 4- **The Elfiq team will then access the unit remotely** to finalize the configuration and ensure proper operation of the unit in place.

6. Managing Guest Networks

How can I meet guest demands in my network?

It is becoming commonplace to see guests and patients use or wish to use their electronics equipment connecting to the Internet. These demands will significantly stress an existing network in terms of download requirements from such devices as smart phones, laptops, video game consoles and tablet computers, which commonly use the Internet for business connectivity



By using an Elfiq Link Balancer combined with the appropriate carrier links to complement existing bandwidth installed at a site, healthcare providers can deliver reliable Internet access to guests and patients and even turn this service into a revenue source. This type of deployment is now commonplace in hotels and airports around the world, where Elfiq products bring very high satisfaction scores from visitors and guests for Internet access.

Produced by Elfiq Networks

Elfiq Networks is a technology leader and innovator in the field of WAN link management and balancing. With hundreds of successful installations in over 79 countries, Elfiq's Link Balancer products help organizations of any type and size perform more competitively every day with the ability to use multiple Internet and private links easily and securely.

For more information on Elfiq Networks' products and technologies, please contact:

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1,2: *The Costs of Downtime: North American Medium Businesses 2006*, Infonetics Research, March 2006.

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