



Technical Brief

Seamless, Transparent Integration of SD-WAN and Network Security

Introduction

Internet uptime has become critical for organizations across regions and industries in the past decades. Outages and saturation are now among the top concerns of IT specialists. Solutions have evolved over the years to help mitigate those issues, namely by providing the ability to manage multiple ISP connections concurrently.

That said, most solutions on the market today require extensive reconfiguration of the existing network, especially at the firewall level, and introduce an additional point-of-failure to the network. Alternately, other solutions may call for the complete “rip-and-replace” of the existing network infrastructure in order to perform optimally.

But implementing business continuity measures doesn’t need to introduce complexity and vulnerability. ELFIQ by Adaptiv Networks provides failover, aggregation and network performance improvements without requiring the reconfiguration or replacement of your existing network components. ELFIQ provides a solution that is agnostic to firewalls, network providers and technologies, ensuring that you remain in control of your network.

This document is intended to communicate the technology, use cases and business value associated with the Link Balancing and SD-WAN solutions from ELFIQ by Adaptiv Networks.



Technology Overview

Aiming for wire-speed performance, a simplified non-intrusive approach and enhanced security, the core design is based on Layer-2 interceptions of inbound and outbound traffic circulating on the ELFIQ Link Balancer.

There is no need to modify the configuration of the existing network components to integrate the unit into the network, minimizing deployment and operating costs, downtime and, most importantly, risk while deploying the device. Furthermore, Firewalls do not require a separate or duplicated set of rules per ISP, simplifying the process of deploying a Link Balancer.

While delivering superior technological value, the cost savings and return on investment generated provide a positive experience for any organization requiring incremental bandwidth and the use of multiple ISP circuits.

ELFIQ Link Balancers provide rock-solid business continuity:

- 1. Integration**—The Link Balancer can be integrated into the network without making changes to the firewall or routers.
- 2. Transparent and secure Installation**— Because of its design, the Link Balancer is invisible to online attacks.
- 3. LAN Failsafe**— In the event of a power failure, connectivity to the Primary Link is restored in seconds, ensuring uptime while the issue is handled.



Use Case

Audrey is the IT Director at an international chain of retail stores. She oversees the company's network, making sure that all the branches have the connectivity they need to conduct their daily operations. Each branch is connected to the company's main site, from where they can access centralized resources, and go out to the Internet.

For Audrey, the only thing worse than a local outage at a branch location is a general blackout at the datacenter level. With branches across multiple states and timezones left without a working Point-of-Sale system, the company is unable to close sales, resulting in lost revenues. Faced with this challenge, the often-quoted cost of downtime of \$5,600 p/minute¹ looks like a best-case scenario to Audrey.

In order to prevent such outages, Audrey decides to implement a network failover solution, where she could use 3, or preferably more ISP links to guarantee network availability. The problem, of course, is that she can't afford a lengthy integration, which would put the network offline, and likely cause unexpected interactions with the existing firewalls.

Then she found ELFIQ by Adaptiv Networks. Thanks to its innovative Layer-2 design, the ELFIQ solution integrates seamlessly and requires little-to-no network reconfiguration, as it is invisible to the firewall and the ISP routers. Centrally managed and configured, it can be installed within as little as a ten-minute window, minimizing network disruptions, and providing performance benefits immediately.

1. <https://blogs.gartner.com/andrew-lerner/2014/07/16/the-cost-of-downtime/>

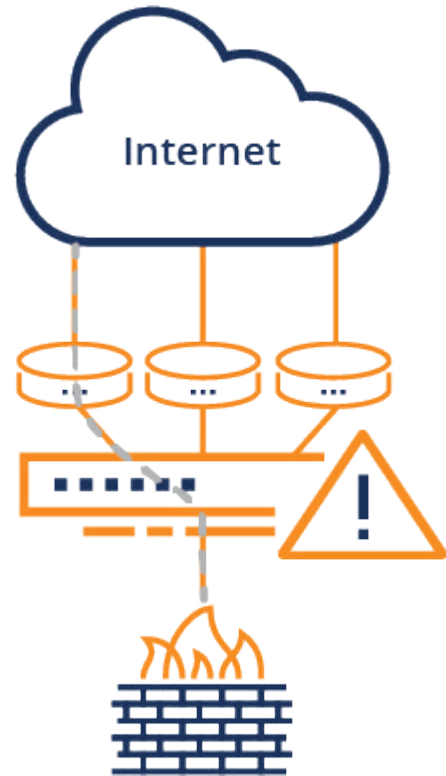


Seamless Integration

The core design is based on Layer-2 interceptions of inbound and outbound traffic circulating on the ELFIQ Link Balancer.

The main product architecture design is the Primary Link concept. To operate in a truly transparent and inline fashion, implementing ELFIQ must not cause any WAN design change; the product will act as the original ISP link prior to the implementation. That way, no gateway or router reconfiguration is required to deploy the Link Balancer. Should a roll-back be required for any reason, the only action required to return the network to its previous state is to connect the original ISP router to the corporate firewall. This level of simplicity is a key characteristic of ELFIQ by Adaptiv Networks.

When handling traffic between the ISPs and the Link Balancer, the ISP router/modem (known as a GMAC or Gateway MAC) is used to handle the traffic as the unit operates on the 2nd layer of the OSI model. The Link Balancer only needs to know the router/modem's Ethernet address (MAC address) to communicate and perform its balancing tasks, contrary to the router/modem's IP address as is the case with Layer-4 Link Balancers.



“ELFIQ by Adaptiv Networks walked us through concepts, architecture, and they even helped us set up our new appliance. When the cutover date came, we literally had less than 10 minutes of down time.”

- Kent Vanderploeg, Indian Prairie School District 204

Transparent and Secure Installation

ELFIQ by Adaptiv Networks integrates at Layer-2, or the data link layer (OSI model), and not at Layer-3 or Layer-4 (network and transport layers), like most competing solutions.

Instead of terminating sessions, ELFIQ inspects and forwards packets and sessions on the fly, without the firewall or ISP router ever having to adjust their behavior. Traffic flows through seamlessly, without ever being interrupted. This makes it transparent, and invisible to the outside world.

This is because the network interfaces on the ELFIQ appliance do not show IP addresses. Consequently, they are also invisible to attackers and do not share the vulnerabilities plaguing other products. Even when running a scan of your network infrastructure, hackers would be unable to detect the devices.

As such it's also agnostic to pre-existing network devices including next generation firewalls (NGFW). For single site environments, it's a solid business continuity play. For multi-site deployments, it's the foundation of a scalable SD-WAN architecture without having to sacrifice the security setup you're already comfortable with.

About the OSI Model

The Open Systems Interconnection model is a conceptual model that abstracts and standardizes the communication functions of IT systems.

Each of its layers uses the layer below it in order to operate. The lower on the ladder, the closer a technology is from the electronic components on which it runs, thereby granting it faster response time and performance.

7 Application

- End User layer
- HTTP, FTP, IRC, SSH, DNS

6 Presentation

- Syntax layer
- SSL, SSH, FTP, MPEG, JPEG

5 Session

- Synch & send to port
- API's, Sockets, WinSock

4 Transport

- End-to-end connections
- TCP, UDP

3 Network

- Packets
- IP, ICMP, IPSec, IGMP

2 Data Link

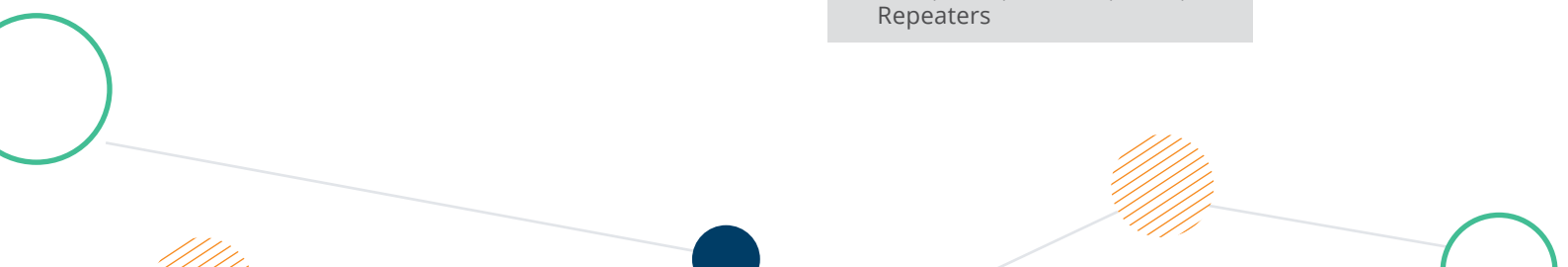
- Frames
- Ethernet, PPP, Switch, Bridge

1 Physical

- Physical structure
- Coax, Fiber, Wireless, Hubs, Repeaters

Other Guys

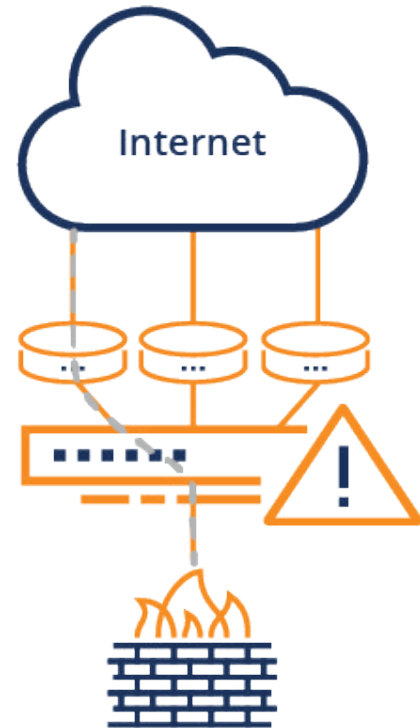
**Elfiq by
Adaptiv**



LAN Failsafe / Fail-to-Wire

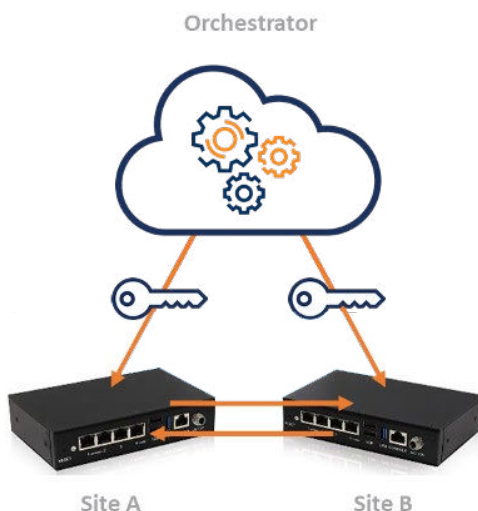
ELFIQ by Adaptiv Networks provides protection against power outages or electrical incidents through its LAN Failsafe feature.

All ELFIQ models include one pair (or more) of bypass ports. In the event where the Link Balancer loses power, two ports will become a closed relay, which will enable traffic to flow to and from the Internet to the firewall(s) until the problem is solved. When a power failure occurs, the firewall and router of the Primary Link will resynchronize to restore connectivity between the gateway(s) and the Primary Link(s), restoring the flow of traffic as it was prior to implementing the ELFIQ solution.



Dynamic Encryption

ELFIQ reduces the overhead caused by maintaining VPN tunnels, and encrypts traffic dynamically, when needed.



Encrypting traffic can take a toll on the performance of your network, especially with classic protocols like IPSec. ELFIQ uses AES-128 and AES-256 to encrypt data flows as needed, and doesn't maintain tunnels open at all times, minimizing the intensive requirements of other VPN solutions.

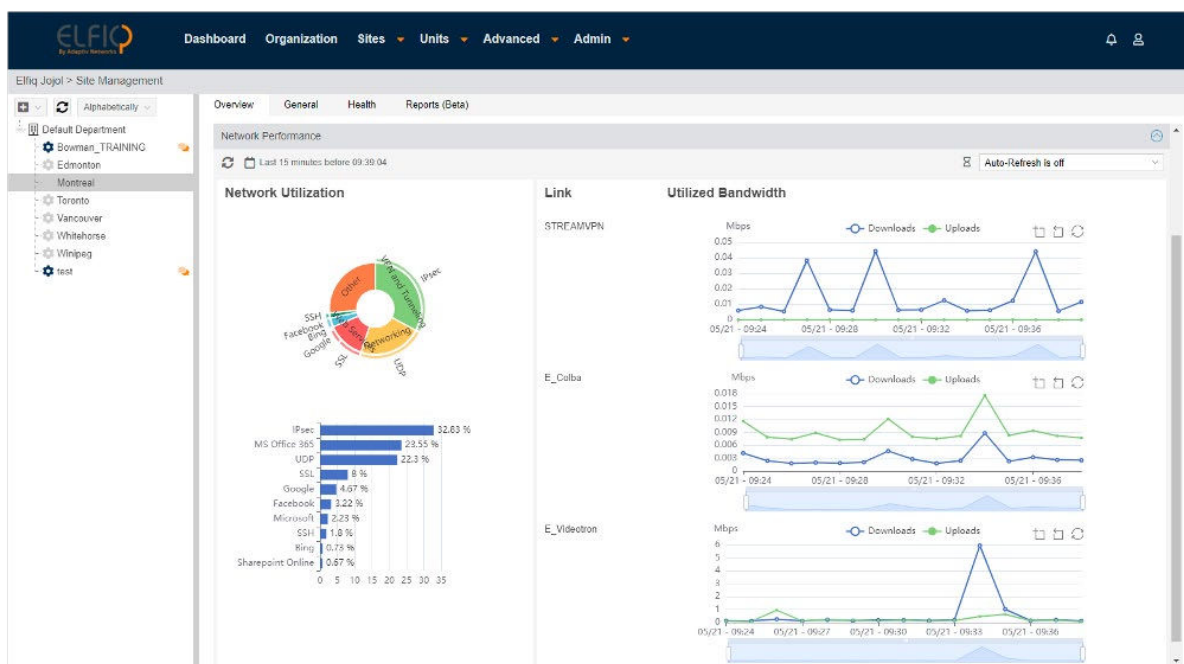
Keeping Your Shadow IT Under Control

Digital Transformation has revolutionized the workplace, making it possible for organizations to adopt and roll-out new services in record times.

On one side, Software as a Service (SaaS) is driving the show when it comes to universal accessibility of corporate resources, and on the other, Bring-your-own-Device (BYOD) is seeing more and more workers using those same resources on their own phones and computers.

Network requirements are estimated with the expected bandwidth usage on applications and services selected and authorized by the organization. When end-users use their own applications on the corporate Wi-Fi without the explicit approval from IT, it puts an unexpected and unnecessary pressure on the network. Worse, it can introduce vulnerabilities. This collection of that unsanctioned usage is called Shadow IT.

Understanding which applications are used is critical in keeping unsanctioned and unauthorized traffic under control. To do so, ELFIQ by Adaptiv Networks allows you to visualize application and service usage, both globally and chronologically. With that information in hand, you can then instruct your ELFIQ product to limit, prioritize or block specific application signatures.



Benefits for your Infrastructure

ELFIQ by Adaptiv proposes a creative and innovative design that unlocks unprecedented level of connectivity, simplicity and uptime, which other platforms cannot achieve.

All the while delivering superior technological value, the cost savings and return on investment generated provide a positive experience for any organization requiring incremental bandwidth and the use of multiple ISP circuits.

Lower Deployment Costs

No modification required to existing network components, minimizing deployment and operating costs, downtime and, most importantly, risk

Universal Compatibility

ELFIQ's Layer-2 approach allows it to be added to any network environment alongside other network solutions

Ready to Deploy

Besides the simplicity of the Primary Link, no additional IP addresses need to be purchased to deliver the unit's capabilities

Better VPN Performance

Reduce the footprint of data encryption by moving to ELFIQ's per flow encryption overlay

Protect Your Cybersecurity Investment

No need to remove or swap your existing firewall.

No ISP Reconfiguration

ELFIQ doesn't require reconfiguring the ISP links or the collaboration of ISPs to improve performance

Application Visibility and Control

Centralized cloud monitoring is also available, should you ever want to increase visibility for your networks and application

Invisible to Attacks

Don't introduce a new target in your infrastructure. Security threats and scans won't detect ELFIQ, as its WAN ports don't have IP addresses

LAN Failsafe

Should the ELFIQ product lose power, connectivity to the Primary Link is restored in seconds, ensuring uptime while the issue is handled

About Adaptiv Networks

Adaptiv Networks is the creator of powerful, software-defined wide-area networks (SD-WANs) for the most challenging locations requiring high availability for business-critical application traffic. Businesses rely on Adaptiv Networks' Cloud-Managed SD-WAN to provide secure, high-performance, and highly reliable networking for their voice, data, and video communications needs. Adaptiv Networks serves more than 250 customers, with more than 2,500 sites deployed through 30 partners.

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