Northwest Multiple Listing Service Deploys the BIG-IP Link Controller to Remove the Complexity and Shortcomings of Multi-homing with BGP

> "BIG-IP Link Controller…[gave] us more flexibility and control to ensure that our site is reliable and fast."
>
> Jeff Banks
> Network Administrator

Industry:
Real Estate

Challenges:
- ISP failures and site downtime
- Complexities of Border Gateway Protocol
- High deployment costs

Solution:
BIG-IP Link Controller

Benefits:
- Improved bandwidth scalability
- Reduced management and support costs
- High availability with immediate ISP failover
- Cost savings by extending existing network capacity

Overview

Like so many organizations now utilizing the Internet as a critical part of their business, NWMLS knows the importance of having multiple connections and ISPs (Internet Service Providers). Having experienced a series of Internet outages and struggles to deploy a multi-homing solution with BGP, NWMLS switched to F5's BIG-IP® Link Controller to ensure they stay connected to their customers.

Challenge

When NWMLS experienced an ISP failure that brought down access to their entire site, they quickly realized that establishing multiple links and ISP providers was critical to ensure the success of their business.

"We had taken care to build resiliency in our network, systems and applications, but that was entirely superseded by the fact that we only had one ISP, one lifeline to our customers," said Jeff Banks, Network Administrator at NWMLS. Losing this access not only negated their critical services, it also stopped other types of important communications such as FTP traffic, email, and employee access to other business partners and data on the Web.

While many ISPs offer Service Level Agreements (SLA), they often fall short of protecting businesses from the financial and reputational damages caused by outages. The fundamental issue for NWMLS became one of control. "From that point on we resolved not to rely on a single ISP. Fundamentally, we wanted to diversify our risk and control our own destiny. When you have a single line or provider, all of their problems essentially become yours."

Multi-Homing With BGP and OSPF Failed To Solve The Problem

To address this problem NWMLS decided to "multi-home" their network. Multi-homing means that a site has more than one WAN link or access gateway to the Internet. This establishes another path for traffic to flow in and out of the data center in the event that one link fails. At the time, NWMLS had a single line with one ISP and added two additional T1 lines from two additional ISPs.

According to Banks, "The real trick to multi-homing is defining how your traffic will flow now that you have more than one path. The question becomes not only how do I steer users down the right link, but how can I determine what the best path is?" At the time, the only solution was to use BGP, or Border Gateway Protocol. While BGP is a core technology for routing IP packets through the Internet, it was not well suited for the task.

Costly to deploy
"BGP was costly, complex to troubleshoot and created significant traffic distribution problems for us," Banks said. "It's definitely not turnkey. Sometimes you have to buy new routers to handle the load and then there are the hidden costs of actually getting it setup." For many organizations, this often means contracting outside experts or bringing on new staff with extensive skill sets in BGP. "While we set this [BGP] up ourselves, we had to make significant changes to our network topology and then coordinate with our various ISPs. In the end, we invested a lot of time and resources to set up the solution, and it introduced latency and performance issues for NWMLS routers because of the increased routing complexity."

Difficult to Troubleshoot
"BGP was especially difficult when a provider would have problems," added Banks. "We'd be forced to wait while the ISP's tried to diagnose a routing problem and determine whose fault it was. There were also instances where some routes were not working well and the only resolution was to shut down our routers and reboot. This would take a long time and force us to bring lines down, which limited our bandwidth and congested other links. Let's just say I had the phone number of my ISP contacts programmed on speed dial for these and other such occasions."

Traffic Distribution Problems
In addition, NWMLS also experienced broader fundamental problems trying to control traffic via BGP routing. "We have a specific brokerage house that represents 40% of our traffic for our Locator real estate application," Banks added. "Because BGP uses broad groupings to make decisions and then stores the IP routing info in the router caches, all the users from that office ended up getting stuck down one of our pipes. Constantly certain links would be overburdened, while others remained underutilized."

NWMLS tried manually clearing out their IP caches to resolve the issue, but this just shifted the problem to new links. Later they wrote scripts that would be executed hourly to clear the router caches and attempt to re-distribute the load, but BGP still experienced severe traffic spikes that made it unmanageable. "We could see our links and routers flat lining," Banks said. "Bottom line: the biggest problem was that with BGP, we couldn't control our traffic the way we wanted."

Solution

In order to build a long-term multi-homing solution and also address their traffic management issues, NWMLS choose the BIG-IP Link Controller from F5 Networks. The BIG-IP Link Controller is an integrated load balancing product that replaces legacy routing protocols with faster more flexible intelligent switching technology.

NWMLS deployed the BIG-IP Link Controller to manage both incoming and outgoing site traffic, and to direct their users over the best link. Deployed between their firewalls and routers, the product regularly measures the health and capacity of each connection of the real-estate clients accessing the NWMLS site. Bandwidth, performance and health of each ISP were automatically measured; each user was then directed down the best possible link. The results were immediate. The BIG-IP Link Controller provided:

The F5 solution provided:

- ***Bandwidth control*** that solved NWMLS BGP and bandwidth scalability problems
- ***High availability*** to assure users stayed connected with immediate ISP failover
- ***Improved performance*** by directing users across the fastest link to avoid congested bandwidth
- ***Reduced management and support*** by providing a greatly simplified multi-homing architecture
- ***Cost Savings*** by reduced router load and extended existing network capacity

The BIG-IP Link Controller not only ensured that customers were connected, but it allowed NWMLS to increase user performance and ensure that their corporate bandwidth investments were maximized to their fullest extent. "When we used BGP, we received quite a few calls a day from realtors complaining about slowness or trouble connecting," according to Banks. "Since we deployed the Link Controller, call volume about performance of our Internet bandwidth dropped significantly. The product solved our bandwidth management problems." To date, NWMLS has passed nearly 3 terabytes of traffic through the Link Controller, while consistently routing customers and clients around failed or congested ISP links.

"Our customers no longer have to pay the price if one of our providers has problems or is getting flooded," explained Banks. "There's no more down time or waiting while 3rd party ISPs try to find the issue. There's no more latency in failing over or waiting for our routers' tables to update through the Internet. It's a whole new level of high availability for Internet connectivity – failover is instantaneous."

By using the BIG-IP Link Controller, NWMLS also increased their network capacity. "By moving away from BGP, we've seen a 15% increase of CPU availability on routers and freed up memory that was previously used for maintaining BGP tables. Using this solution also relieves the stress of making BGP changes that could affect performance of routers outside our network."

Since deploying the BIG-IP Link Controller, the prospect of adding additional providers and links is also much less daunting. "With

BGP, we had to coordinate with providers," said Banks. "With the Link Controller, everything is just a static route. All we have to do is simply add a provider — without involving the ISPs, without affecting the performance of our routing, and without being forced to architect the change in our network. Now we simply configure our router, add the necessary configuration changes to a new link within the BIG-IP Link Controller, and we're done." NWMLS recently increased their WAN connections to include nine T1 lines from three different providers.

Finally, NWMLS has realized other business benefits from their ability to better monitor the traffic passing over their links. "The traffic-watching capabilities in the product are great," said Banks. "Before Link Controller, we could never see what data that the routers/providers were getting. Now we can see what services are being sent over what ISP and for whom. This gives us a better understanding of how our resources are being utilized and provides a better view into our network for troubleshooting and capacity planning."

"Bottom line, the BIG-IP Link Controller greatly simplified our multi-homing environment, giving us more flexibility and control to ensure that our site is reliable and fast," said Banks. "The end result is we can build our business on Internet technologies and at the same time optimize and have visibility into our bandwidth investments."

F5 Networks, Inc.
Corporate Headquarters
401 Elliott Avenue West
Seattle, WA 98119
(206) 272-5555 Voice
(888) 88BIGIP Toll-Free
(206) 272-5556 Fax
www.f5.com
info@f5.com

F5 Networks
Asia-Pacific
+65-6533-6103 Voice
+65-6533-6103 Fax
info.asia@f5.com

F5 Networks, Ltd
Europe/Middle-East/Africa
+44 (0)1932 582 000 Voice
+44 (0)1932 582 001 Fax
emeainfo@f5.com

F5 Networks
Japan K.K.
+81-3-5114-3200 Voice
+81-3-5114-3201 Fax
info@f5networks.co.jp