

Advanced Inbound Traffic Engineering in Practice

Learn how FOCUS Broadband gained optimal control over the inbound traffic by using IRP's automated inbound commit control feature.

CUSTOMER OVERVIEW

FOCUS Broadband is a member-owned cooperative providing a multitude of communications services, including telephone, business systems, wireless, Internet/Broadband, cable television service, and FOCUS Broadband Security, in Brunswick County, NC. Serving Brunswick County since 1957, the cooperative currently provides service to more than 37,000 members and employs more than 200 people. FOCUS Broadband is the largest telephone cooperative in North Carolina and one of the largest in the USA.



Customer Name:
FOCUS Broadband

Industry:
Telecommunications

Location:
Shallotte, North Carolina, USA

Business Challenges:

- Bandwidth usage management capability for the inbound traffic, keeping the ingress traffic under commit levels during peak hours;
- Adopting automated traffic optimization vs. manual checks and verifications tactics;
- Reduction of network Latency and Packet Loss;
- Overall network performance boost;
- Detailed analytics on the network performance and applied improvements;

CHALLENGE

The fluctuating shape of inbound traffic has always been an overhead for FOCUS Broadband. Certain links were getting overloaded, while other remained barely used. To handle such situations, FOCUS Broadband's network engineers had to manually add or remove prepends to the affected neighboring links during peak hours. The process was time consuming and error prone. The changes were occasionally forgotten and other times were pushing traffic to other links, overloading them and recreating the problem.

The implementation of a BGP automation product with the focus on incoming traffic optimization capability was needed in order to accommodate the growing levels of traffic and ensure an utmost end-user experience even during peak hours.

By the end of 2016, FOCUS Broadband started to look for a solution to address the above-mentioned issues. Besides the bandwidth usage management capability, proactive detection of latency and packet loss was on the agenda as well.

SOLUTION

FOCUS Broadband selected Noction IRP to enhance its network performance, minimize latency and packet loss as well as to optimize the company's inbound traffic during peak hours.

The Intelligent Routing Platform deployment process consisted of three distinct phases:

Non-Intrusive mode phase:

After obtaining the network-related information and configuration from FOCUS Broadband, Noction engineers deployed the Intelligent Routing Platform in Non-Intrusive mode. While running in this mode, the system was not advertising any improvements to client's network, but rather highlighting the potential improvements within FOCUS Broadband's environment and reflecting them in the platform's reports and graphs.

Intrusive mode phase:

After the system configuration was completed and manual route propagation tests were performed to ensure the edge routers

proper behavior, the system was switched to the Intrusive mode. While running in this mode, IRP started to inject the computed improvements into FOCUS Broadband's edge routers routing tables, automatically directing outbound traffic through the best performing providers.

Inbound traffic optimization phase:

To properly enable IRP's inbound optimization within FOCUS Broadband's network, Noction engineers came up with an individual implementation plan offering step by step guidance, configuration examples, testing, and ongoing support of the platform.

Individual router capabilities were evaluated to see if they could accept and implement Inbound improvements announced by IRP. This was done to determine how the Optimized Networks were originated and aggregated. Providers prepends behavior has been checked. Since some providers did not accept the prepends, Noction engineers prepared route-maps that would make use of provider's prepend and preference communities.

IRP has been configured with inbound next_hop and inbound localpref being set for each affected BGP router. The community base for each affected Provider has been set as well. Inbound larger prefixes were split into smaller ones in order to allow more granular control over incoming traffic, avoiding situations when a single inbound prefix would carry the bulk of the traffic, making improvements ineffective.

Route maps adjustments have been coordinated with customer's engineers to avoid possible conflicts between FOCUS Broadband's core, originating and edge router data.

Further on, two sets of Inbound Commit Control limits were configured in IRP:

high limits - that set the 95th high enough for the IRP to make only a few improvement recommendations so that these could be reviewed, approved and monitored to produce the desired effects.

actual limits - the set of targets that corresponded to the needs of FOCUS Broadband's network. Depending on the provisioned capacity the limits could generate frequent inbound improvements or only exceptional situation improvements.

As soon as the Inbound Optimization has been activated, the Moderated Inbound Improvements feature has been enabled as well. Noction engineers monitored the inbound traffic optimization behavior every 15 min during the initial 4 hours and every 60 min during the following 20 hours of the platform's operation. They checked the IRP's proposed Inbound Improvements for traffic to be shaped accordingly and approved those improvements.

Once the inbound optimization has proven to be fully operational, the Moderated Inbound Improvements feature was turned off. The flow of automatic improvements remained under Noction's close monitoring during the subsequent 24 hours.

IRP's Inbound Commit Control feature offered FOCUS Broadband the ability to balance ingress traffic by automatically manipulating BGP advertisements for different upstream providers, thus influencing the selection of routes on the Internet and shaping the traffic entering the company's network.

After the platform's successful deployment, FOCUS Broadband was able to keep the bandwidth levels at preconfigured 95th percentile value for its three providers. Whenever a specific provider was getting overloaded, IRP would automatically reroute traffic to the providers whose load was less than their 95th percentile using providers known prepend communities.

Provider 1



Provider 2



Provider 3



“From start to finish, Noction’s support team has been excellent to work with. They’ve been really responsive and knowledgeable, demonstrating a genuine desire to help guide us through every step of the product deployment process.

IRP is saving us man hours and is providing a peace of mind, knowing that our Internet links are not getting saturated, with traffic being distributed across all our links as improvements are being made. This of course impacts the performance that our customers see.” mentioned Tim Smith, FOCUS Broadband Data Services Foreman.

RESULTS

The Noction IRP results surpassed the customer’s expectations. Since the deployment of the product within the company’s network, Intelligent Routing Platform brought the following benefits to FOCUS Broadband WAN:

- FOCUS Broadband gained optimal control over the inbound traffic, keeping the bandwidth levels below the preset thresholds for all the providers at all times.
- Manual, time consuming bandwidth checks and verifications as well as error prone direct AS prepends tactics has been replaced with IRP’s automated inbound commit control feature which uses providers known prepend communities, integrated in IRP routing policies to intelligently route traffic.
- Significant drop in packet loss has been observed for FOCUS Broadband’s outbound traffic. IRP reduced Packet Loss by an average of **79%** for the analyzed prefixes. The average network latency to destinations has been reduced by nearly **22.4%**, from **219** milliseconds to **170** milliseconds.
- IRP’s comprehensive analytics provided detailed information on the overall state of the network and the improvements performed.

“We are extremely impressed with the IRP performance. FOCUS Broadband is dedicated to excellence in customer service and providing communications services that add value to the lives of our customers and the communities we serve. Noction IRP helps us support this mission statement and is now an important basis of our network’s utmost performance.” stated Tim Smith.