# AS6461 IP NETWORK

## BGP and Dynamic IRR Service Management Policy

# Overview

This Policy provides guidelines for implementing new BGP-based services, changing existing BGP-based services, or requesting dynamic prefix updates using Zayo's IRR subscription service on Zayo's public network AS6461. The Policy is intended to provide reasonably accurate technical information related to BGP Service Management and does not constitute an agreement between 3rd parties and Zayo. In case of conflict between this document and any written document between a 3rd party and Zayo, the written agreement shall govern.

**DISCLAIMER: ZAYO EVALUATES THIS POLICY ON AN ONGOING BASIS AND RESERVES THE RIGHT TO MAKE CHANGES TO IT AT ANY TIME AT ITS SOLE DISCRETION. THIS BGP MANAGEMENT POLICY ESTABLISHES A SET OF GUIDELINES GOVERNING MODIFICATIONS TO ROUTING TABLES.**

# Table of Contents

# 1. Background

The Internet ecosystem is made up of thousands of networks exchanging Terabytes of data per second; while the spirit of the Internet is founded on a free and constant flow of traffic, security and protection remain a top priority for service providers and their customers, alike. To achieve security improvements across Internet infrastructure, it requires collaboration and commitment from all networks involved. As a network operator and service provider, Zayo continues to evaluate and implement security measures to improve our customer experience and ensure that our customers' valuable resources are protected and secure. Moving forward, Zayo will require Two-factor authentication (2FA) for changes or additions to existing or new BGP sessions and Dynamic IRR subscriptions. All changes to high-level network configurations will be processed through the 2FA for Autonomous System (AS) owners.

## 1.1 MANR's Compliance

Zayo's commitment to our customers' infrastructure and MANR's compliance will provide best practices for the security of our customers and the global internet routing table. This policy aims to establish all BGP-based service configurations by validating technical contact information provided by the authoritative Regional Internet Register (RIR). This policy will allow all Autonomous Systems (ASs) to be added or modified in Zayo's Internet backbone systems via 2FA for BGP.

## 1.2 Responsibility

It is Zayo's responsibility as a network operator to impede bad actors impersonating AS owners that disrupt and contaminate the internet's global routing system by inhibiting the propagation of incorrect routing information. As a result, Zayo will be doing due diligence to protect the global Internet tables from corruption via 2FA for BGP.

# 2. Requirements and Trusted Contacts

## 2.1 Applications for New and existing customers

Two-Factor Authentication (2FA) is required when implementing new BGP-based services, changing existing BGP-based services, or requesting to have dynamic prefix updates using Zayo's IRR subscription service on Zayo's network infrastructure.

### 2.1.1 Modalities for Requests

Example modalities of this information may include the following:

- IP Justification Form [Link]
- NCC requests [NCC@Zayo.com]
- Service Orders

## 2.2 RIR Contact Selection

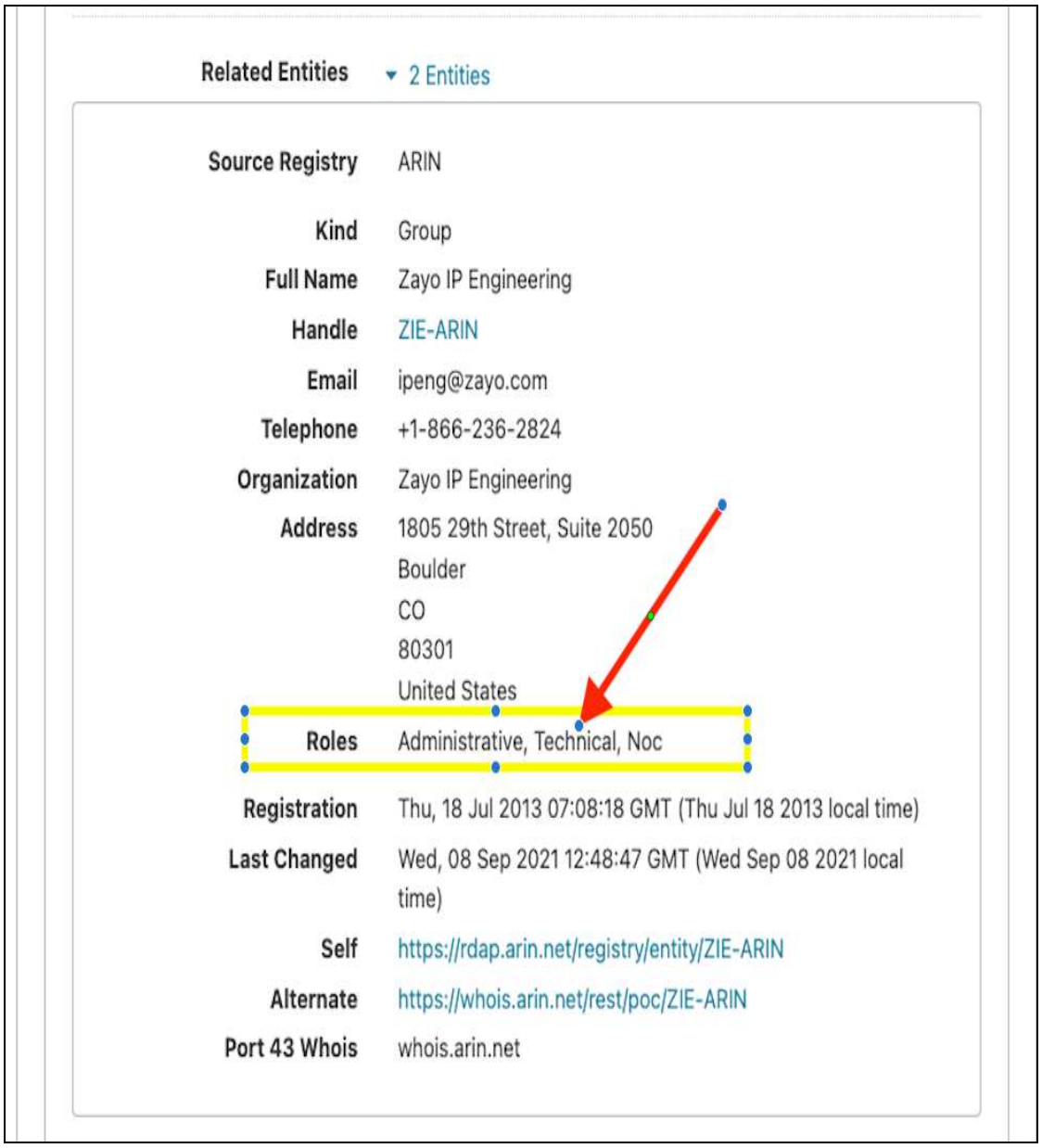
Zayo will use the Regional Internet Registry ("RIR") databases to identify the administrative or technical contact for the AS. If the customers' RIR records are out of date, Zayo requires the customer to update them to ensure we mutually protect IP infrastructure.

### 2.2.1 RIR Who-Is Links

The Administrative or Technical RIR contact selected will vary based on which region the IPs are registered. An example can be found in **Figure 1.1**

- North America RIR [ARIN Link]
- European RIR [RIPE Link]
- Asia Pacific RIR [APNIC Link]
- Latin America RIR [LACNIC Link]

**Figure 1.1 RIR Contact Selection**



# 3. Process Overview

## 3.1 BGP Peering Session Change Requests

Once a BGP Peering Session change request is received from one of the modalities listed in Section 2.1.1 above, Zayo will contact the person(s) listed in the RIR Database outlining the requested changes.

### 3.1.1 Receiving BGP Session Change Requests

Upon receiving a customer's BGP peering session change request, an internal Zayo user will look up the RIR contact and send an email with a 32-character Request ID.

### 3.1.2 Confirming BGP Session Changes

The customer must reply with the words "Approve" and include the Request ID in the response. Following this, the Zayo user will process the BGP Session Change request. The email will come from bgp.authorizations@zayo.com. An example format can be found in **Figure 1.2**.

**Figure 1.2 BGP Authorization Email**

RIR_Contact@customer.com

BGP Authorization to Access AS[XXXXX]

Request ID: Xxb7vhg4xE8JJ0VAGgETMr5bn2zYy4Re

<Organization Name>

Zayo (AS6461) has received a request on Service Order [XXXXXXX] to allow the following changes regarding the RIR object listed above. Your contact information is listed in the RIR database as either an Administrative or Technical contact for this object:

Install a BGP peer between AS6461 and AS[XXXXX]

Please reply to this notice with the words "Approve" to authorize this activity.
Please ensure that the Request ID is included in your reply as verification.

Thank you,

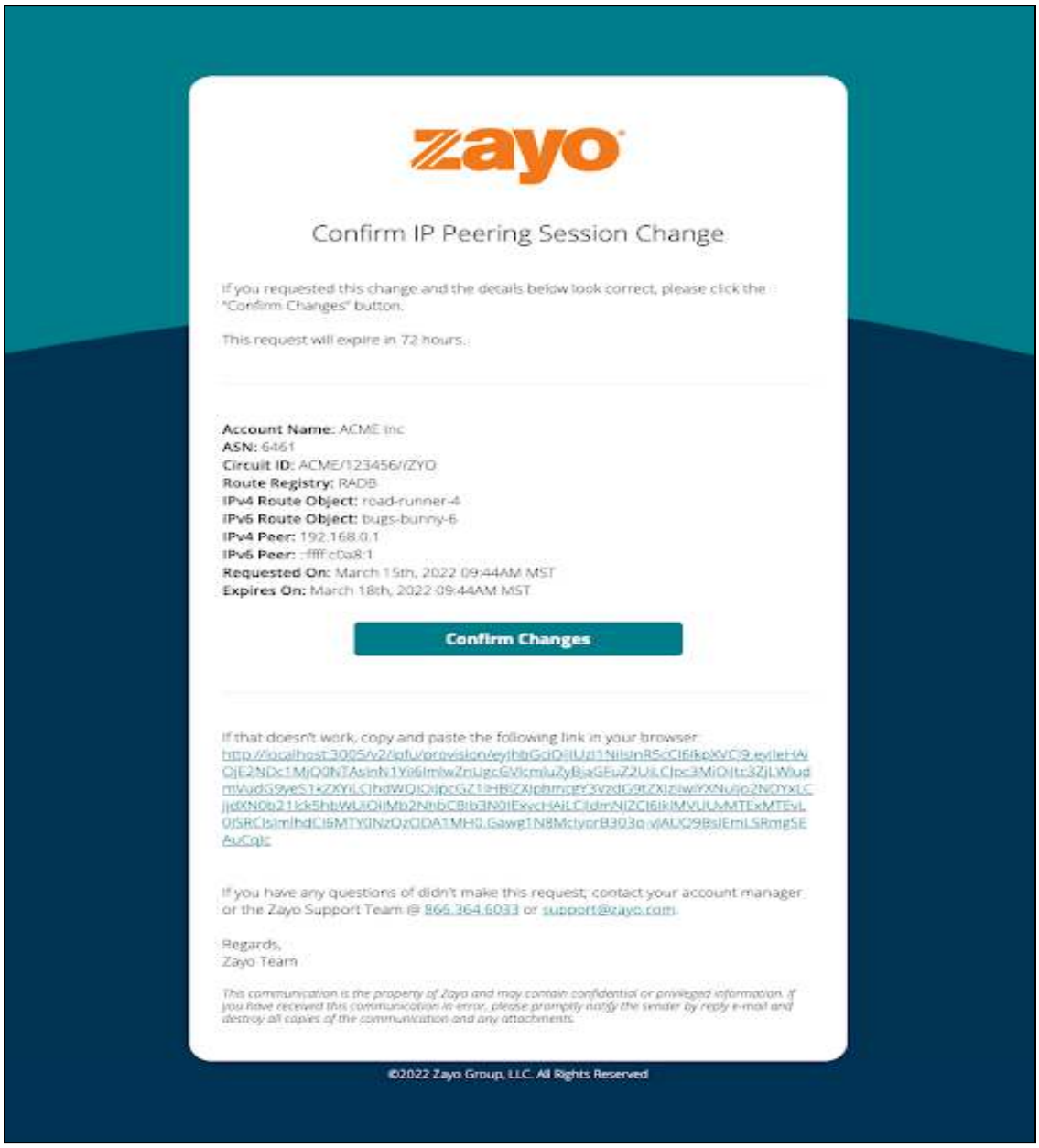
Zayo IP Install Team
bgp.authorizations@zayo.com

## 3.2 Dynamic Prefix Updates

### 3.2.1 Validating Dynamic IRR Session Changes

To validate the Dynamic IRR session change, the customer must review and approve the changes outlined in the email within 72 hours. An example format can be found in **Figure 1.3**

**Figure 1.3 Validating Dynamic IRR IP Peering Session Change**



### 3.2.2 Confirming Dynamic IRR Session Changes

Upon customer validation of the Dynamic IRR session change, the customer will receive a confirmation email from Zayo outlining the changes processed and establishing the subscription. An example format can be found in **Figure 1.4**

**Figure 1.4 Confirming Dynamic IRR IP Peering Session Change**

## 4. Process Governance

Zayo will ensure the organization name in the RIR matches the customer requesting changes. If these do not match, Zayo will require a Letter of Authorization ("LOA") or other documentation from the RIR owner before proceeding with this process. The goal is to ensure that the customer requesting the changes is authorized to do so.

### 4.1 RIR Contact Requirements

- To process the BGP changes or additions, the RIR contact MUST:
    - Respond to the email with the words "Approve."
    - Provide Zayo with the unique token sent to the RIR contact
        - The email will come from bgp.authorizations@zayo.com or NCC@zayo.com
- To process dynamic prefix updates with Zayo's IRR subscription, the RIR contact MUST:
    - Click on the "Confirm Changes" button from the autogenerated email
- If the customers' RIR records are out of date (i.e., invalid email or lack thereof), Zayo requires the customer to update them to ensure we mutually protect IP infrastructure.
    - Once the customer has updated their records, Zayo will resend the email to the newly listed contacts, and the process outlined above will go into effect.

*Note: The customer may respond to the email from any account within 72 hours but must provide the details outlined above.*

#### 4.1.1 Expiration Period

The customer contact must approve the requested changes within 72 hours, as Zayo will not authorize any changes outside of this window. If the token or link has expired, the customer can request a new token to be sent by the Zayo user after exceeding the expiration period.

#### 4.1.2 Exceptions

Escalation for out of process approval are evaluated on an individual case basis and approval may only be granted by VP of Lit Networks Technology and the Chief Security Officer at Zayo.

## 5. Future Outlook

### 5.1 Industry Standards

Zayo is the first carrier to market with 2FA for changes to BGP Peering Sessions. While small barriers are in place to implement changes on your network, the core reason for this policy is to ensure the security and protection of your network assets. Internet services are susceptible to AS Impersonation, threatening network operators and customers, alike. Similar to the adoption of Resource Public Key Infrastructure (RPKI) amongst ISPs, 2FA via RIR databases will improve security across the Public Internet and become the industry standard within the next few years.

## 6. Frequently Asked Questions

- What is the expiration interval on the unique token for the BGP change request?
    - 72 hours
- What happens if the customer contact responds after the token expires?
    - Zayo will not authorize the change and will resend an email with a new token.
- How does Zayo retrieve the contact information from the customer?
    - Zayo's systems will use the Regional Internet Registry (RIR) contacts as the source of truth for authorization requests.
- Which contacts are we sending the verification email to?
    - Administrative and Technical Contacts are selected via the RIR.
- What if the contact information is not updated in the RIR?
    - Zayo will require the customer to update their records to ensure they are authorized to approve the requested changes.
- What happens if more than one customer contact responds to the BGP Session Change Request?
    - After the first contact responds, it would deactivate the token and show an error message.
- Why is Zayo doing this, and why are other providers not?
    - Zayo's commitment to our customers' infrastructure and MANR's compliance will provide best practices for the security of our customers and the global internet routing table. It is our belief that it will be adopted across the industry.

## 7. Glossary

| Term | Definition |
|---|---|
| ASN | Autonomous Systems Numbers are required by network operators in order to govern traffic within their infrastructure for the purpose of other Internet Service Providers (ISPs) being able to exchange routing information. An Autonomous System (AS) is a collection of at least one IP prefix managed by a singular, well-defined routing protocol maintained by the network operator. |
| RIR | Regional Internet Registry is an organization that manages the allocation and registration of IP resources within a specified region of the world. |
| MANRs | Mutually Agreed Norms for Routing Security is a global initiative that helps reduce the most common routing threats |
| BGP | Boarder Gateway Protocol is a standard exterior gateway routing protocol designed to exchange routing information among AS's |
| 2FA | Two-Factor Authentication is a security process in which a user provides two different authentication factors to verify themselves. |
| IRR | Internet Routing Registries contain information submitted and maintained by ISPs or other entities about ASNs and routing IP prefixes. |
| NCC | Network Control Center is owned and managed by Zayo to continuously monitor the performance and health of our network, operated 24/7/3659 |
| LOA | Letter of Authorization is an agreement between a principal, authorizing an agent to perform certain functions in order to perform the duties of a principal. |
| RPKI | Resource Public Key Infrastructure is a security framework that helps network operators make more informed and secure routing decisions for BGP announcements. In turn, this prevents bad actors from advertising address space (spoofing/hijacking) that isn't theirs, which can result in critical outages or fraudulent traffic manipulation. |