

Using Amazon AWS Route 53 for SIP Servers Survivability via a single FQDN

In redundant SIP servers environments, where the endpoints do not offer the possibility of defining a Secondary/Backup SIP server, such as in Zulu 3 (currently) and in other possible endpoints (phones, softphones, gateways, etc.), having a DNS service that would quickly and automatically switch the IP address a single FQDN resolves to, would be very convenient as it will allow for the automatic failover between the two such redundant SIP servers be possible.

In this guide we will be using two PBXact v14 appliances along with Zulu 3 as the endpoint but this could also be applied to other SIP servers such as SBCs or other endpoints such as SIP softphones lacking a the possibility of defining a Secondary/Backup SIP server.

Pre-Requisites

- [Amazon AWS Route 53 account](#)
- Both SIP servers must be reachable through a different public IP address of their own
- For automatic syncing of configurations and records (CDR, logs, etc) between two PBX servers, a [Warm Spare backup and restore job](#) should be properly configured first

Limitations

- Only one Health Checker, that is, AWS Route 53 method for determining server availability, can be setup at a time (ie. only one, the AMI port 5038 or the Zulu port 8002, could be monitored to determine if the PBX service is available or not). This brings the following possible complications:
 - When Asterisk process (tcp 5038) is selected to be monitored on AWS Route 53 for checking PBX availability (***recommended as asterisk service tends to fail more commonly than zulu server***)
 - If only Asterisk fails (tcp 5038), but not Zulu (tcp 8002), AWS will switch the IP address the FQDN resolves to. Zulu will not be able to automatically failover though as it does not detect any problem registering with the current server. Restarting the Zulu application will make the failover take place
 - If only Zulu fails (tcp 8002), but not Asterisk (tcp 5038), AWS will NOT switch the IP address the FQDN resolves to. Zulu will get disconnected as expected. Troubleshooting would be needed to determine the cause for Zulu server failing and bringing it back up
 - When Zulu process (tcp 8002) is selected to be monitored on AWS Route 53 for checking PBX availability
 - If only Asterisk fails (tcp 5038), but not Zulu (tcp 8002), AWS will NOT switch the IP address the FQDN resolves to. Zulu will not be able to make or receive calls as expected. Troubleshooting would be needed to determine the cause for Asterisk failing and bringing it back up
 - If only Zulu fails (tcp 8002), but not Asterisk (tcp 5038), AWS will switch the IP address the FQDN resolves to. Zulu will automatically failover (*Note*: restarting the Zulu application may still be needed for correctly authenticating on the new server)
- Zulu 3 has (currently) no possibility for defining the value for its SIP Registration Expiry timer, it is permanently set to 600 seconds (10 minutes). This makes it necessary to restart the application once the main server has come back online in order to failover back to it

Step-by-step guide

[Configurations on Amazon AWS Route 53:](#)

1. Register or Transfer a Domain

Registered domains > Register Domain

← → ↻ https://console.aws.amazon.com/route53/home#DomainListing: ☆ | 🌐 | ⋮

aws Services ▾ Resource Groups ▾ 🔍 🔔 ▾ Global ▾ Support ▾

Dashboard
Hosted zones
Health checks
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Traffic policies
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Domains
Registered domains
Pending requests
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VPCs
Inbound endpoints
Outbound endpoints
Rules

Register Domain **Transfer Domain** Domain Billing Report

🔍 Search domains by prefix ✕ | ⏪ < < Displaying 1 to 1 out of 1 domains > > ⏩

Domain Name	Privacy Protection	Expiration Date	Auto Renew	Transfer Lock
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← → ↻ https://console.aws.amazon.com/route53/home#DomainRegistration: ☆ | 🌐 | ⋮

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1: Domain Search
2: Contact Details
3: Verify & Purchase

Choose a domain name

Check

To register a domain name, start by finding one that's available. Enter the first part of the name (such as example in example.com), choose an extension (such as .com or .org), and click Check. We'll tell you whether it's available and whether you can get it with other extensions. [Learn more.](#)

Shopping cart

Cancel **Continue**

- 1: Domain Search
- 2: Contact Details
- 3: Verify & Purchase

Choose a domain name

Availability for 'mydomain.com'

Domain Name	Status	Price /1 Year	Action
mydomain.com	✗ Unavailable		

Related domain suggestions

Domain Name	Status	Price /1 Year	Action
domydomain.com	✓ Available - In Cart	\$12.00	<input type="button" value="Add to cart"/>
freemydomain.com	✓ Available	\$12.00	<input type="button" value="Add to cart"/>
getmydomain.net	✓ Available	\$11.00	<input type="button" value="Add to cart"/>
makemydomain.net	✓ Available	\$11.00	<input type="button" value="Add to cart"/>
midemane.com	✓ Available	\$12.00	<input type="button" value="Add to cart"/>
mydomaincheck.com	✓ Available	\$12.00	<input type="button" value="Add to cart"/>
mydomainlist.net	✓ Available	\$11.00	<input type="button" value="Add to cart"/>
mydomainpay.com	✓ Available	\$12.00	<input type="button" value="Add to cart"/>
mydomainsearch.net	✓ Available	\$11.00	<input type="button" value="Add to cart"/>
mydomaintime.com	✓ Available	\$12.00	<input type="button" value="Add to cart"/>
paymydomain.com	✓ Available	\$12.00	<input type="button" value="Add to cart"/>

aws Services Resource Groups Global Support

1: Domain Search

2: **Contact Details**

3: Verify & Purchase

Contact Details for Your 1 Domain

Enter the details for your Registrant, Administrative and Technical contacts below. All fields are required unless specified otherwise. [Learn more.](#)

My Registrant, Administrative and Technical Contacts are all the same:
 Yes No

Registrant Contact

Contact Type

First Name

Last Name

Organization

Shopping cart

One-time fees

domydomain.com

Register for year **\$12.00**

SUBTOTAL **\$12.00**

Monthly Fees for DNS Management

[View pricing details](#) for Route 53 queries and for the hosted zone that we create for each new domain.

1: Domain Search

2: **Contact Details**

Check your contact details

Confirm that the following contact information is correct. When you complete your purchase, we'll use this information for all of the domains in your shopping cart.

Registrant Contact	Administrative Contact	Technical Contact
John Doe	John Doe	John Doe

[Cancel](#) [Back](#) [Complete Purchase](#) ⓘ

Once the Domain is registered, AWS Route 53 will automatically create a Hosted Zone for it.

2. Create the Health Check for AWS Route 53 to know when to deem a server as unhealthy and proceed to switch the IP address the Domain (FQDN) resolves to.

Health checks > Create health check

← → ↻ <https://console.aws.amazon.com/route53/healthchecks/home#/> ☆ | 🌐 | ⋮

aws Services ▾ Resource Groups ▾ 🔍 🔔 ▾ Global ▾ Support ▾

Create health check Delete health check Edit health check ↻ ⓘ

Dashboard
Hosted zones
Health checks
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Inbound endpoints
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Rules

Filter by keyword << < 1 to 2 of 2 health checks > >>

Name	Status	Description
------	--------	-------------

Info Monitoring Alarms Tags Health checkers Latency

No health check selected.

← → ↻ <https://console.aws.amazon.com/route53/healthchecks/home#/create> 🔍 ☆ 🏠 | 🌐

Step 1: Configure health check

Step 2: Get notified when health check fails

Configure health check

Route 53 health checks let you track the health status of your resources, such as web servers or mail servers, and take action when an outage occurs.

Name

What to monitor Endpoint Status of other health checks (calculated health check) State of CloudWatch alarm

Monitor an endpoint

Multiple Route 53 health checkers will try to establish a TCP connection with the following resource to determine whether it's healthy. [Learn more](#)

Specify endpoint by IP address Domain name

Protocol

IP address *

Port *

Advanced configuration

Request interval Standard (30 seconds) Fast (10 seconds)

Failure threshold *

Latency graphs

Invert health check status

Disable health check By default, disabled health checks are considered healthy. [Learn more](#)

Health checker regions Customize Use recommended

- US East (N. Virginia)
- US West (N. California)
- US West (Oregon)
- EU (Ireland)
- Asia Pacific (Singapore)
- Asia Pacific (Sydney)
- Asia Pacific (Tokyo)
- South America (São Paulo)

URL <tcp://main.pbx.ip.address:5038/>

Health check type Basic - no additional options selected ([View Pricing](#))

* Required Cancel

The "Request interval" and "Failure threshold" parameters inside the "Advanced configuration" section allow us to control how 'quickly' would a failing SIP server be detected, which in turn makes Amazon AWS Route 53 proceed to switch the IP address the Domain (FQDN) resolves to

Optionally, you can create an alarm to get notified via email when the server becomes unhealthy (ie. reaching TCP port 5038 is not possible)

aws Services Resource Groups

Create health check

Step 1: Configure health check

Step 2: Get notified when health check fails

Get notified when health check fails

If you want CloudWatch to send you an Amazon SNS notification, such as an email, when the status of the health check changes to unhealthy, create an alarm and specify where to send notifications.

Create alarm Yes No

CloudWatch sends you an Amazon SNS notification whenever the status of this health check is unhealthy for one minute.

Send notification to Existing SNS topic New SNS topic

Topic name * PrimaryServerDown

Recipient email addresses * myemail@mydomain.com

Separate multiple addresses with a comma, a semicolon, or a space

* Required Cancel Previous **Create health check**

3. Assign your SIP servers, along with the Health check, to your Hosted Zone

← → ↻ https://console.aws.amazon.com/route53/home?#hosted-zones

aws Services Resource Groups

Create Hosted Zone Go to Record Sets Delete Hosted Zone

Search all fields All Types Displaying 1 to 1 out of 1 Hosted Zones

Domain Name	Type	Record Set Count	Comment	Hosted Zone ID
mydomain.com	Public	4	HostedZone created by Route53 Registrar	Z2E5LDR35CA4BH

Dashboard

Hosted zones

Health checks

Traffic flow

Traffic policies

Policy records

Domains

Registered domains

Pending requests

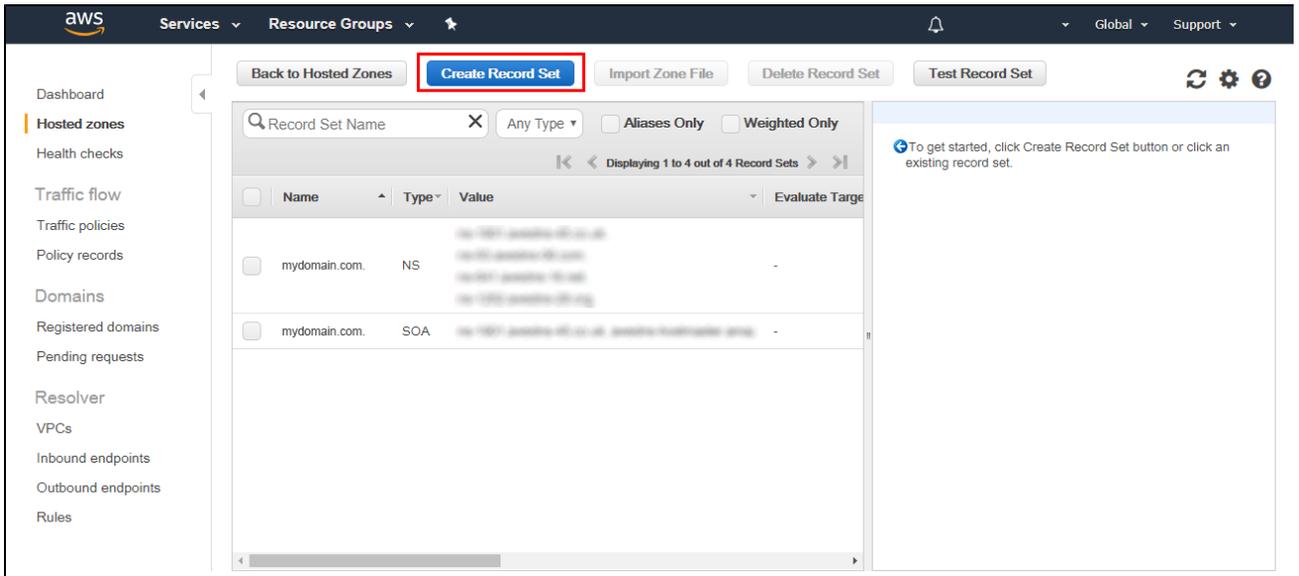
Resolver

VPCs

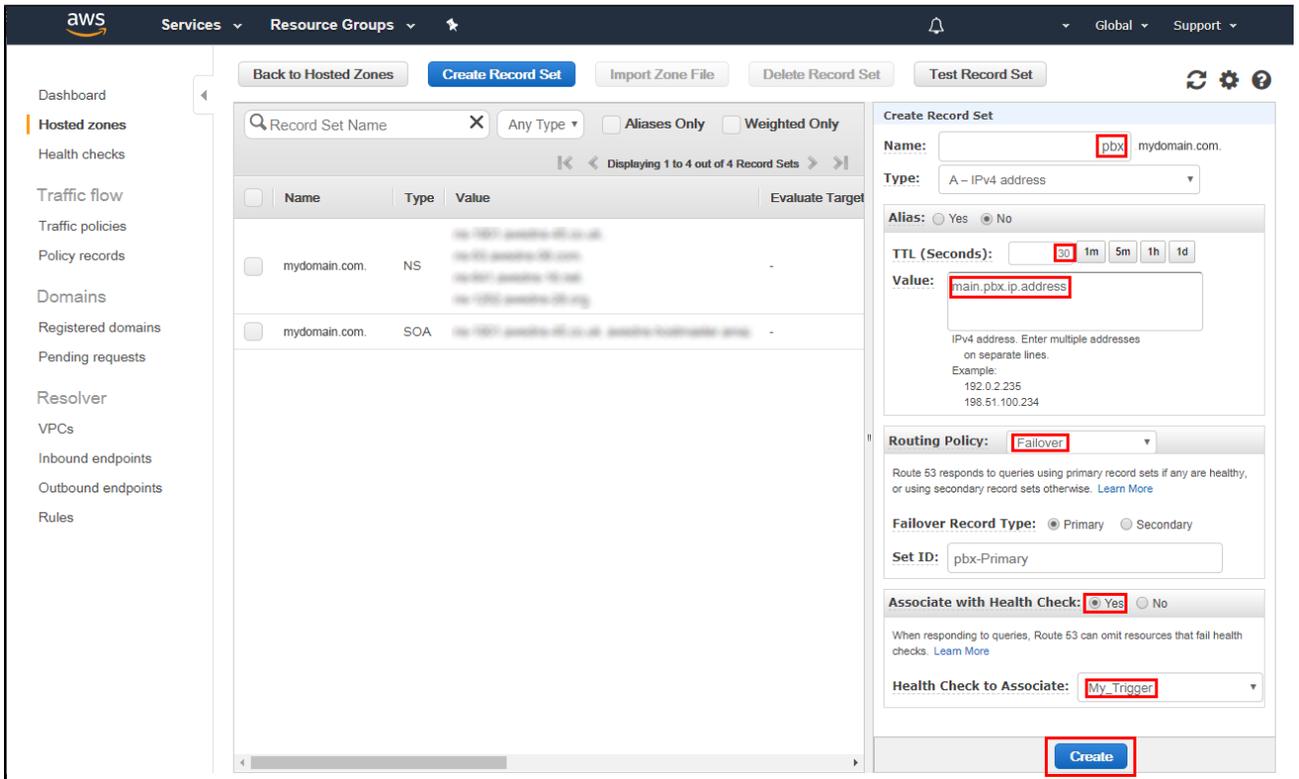
Inbound endpoints

Outbound endpoints

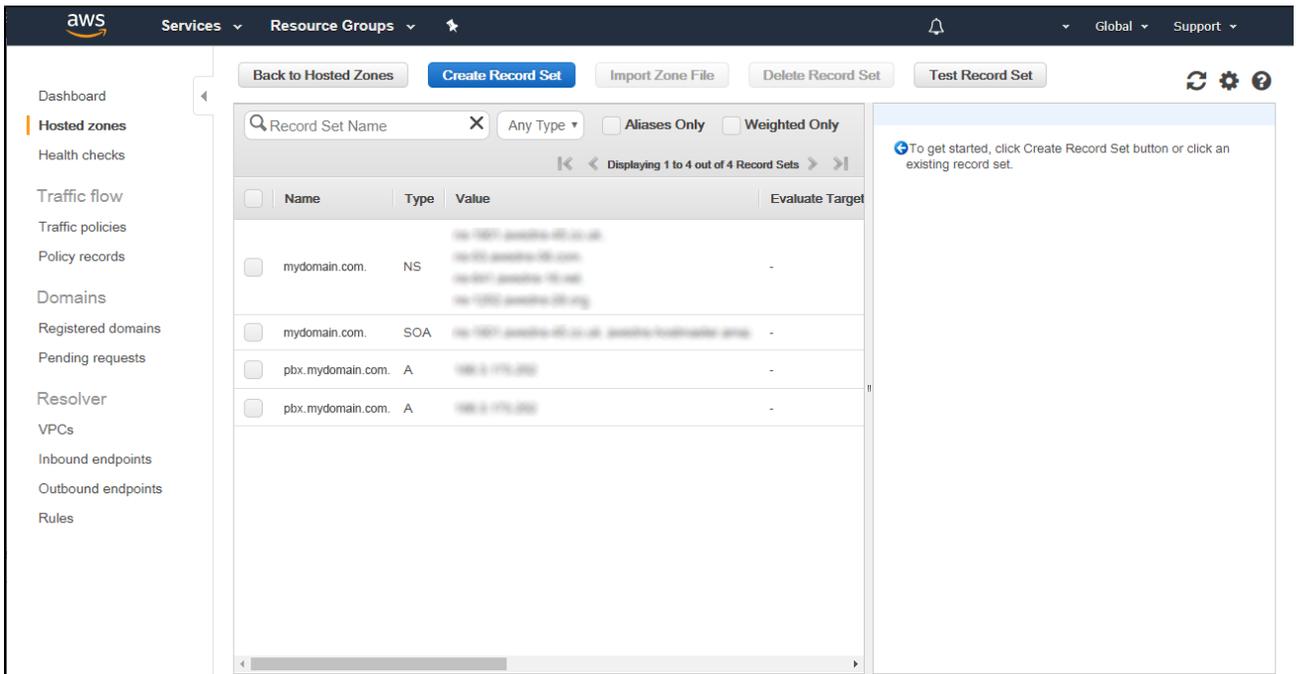
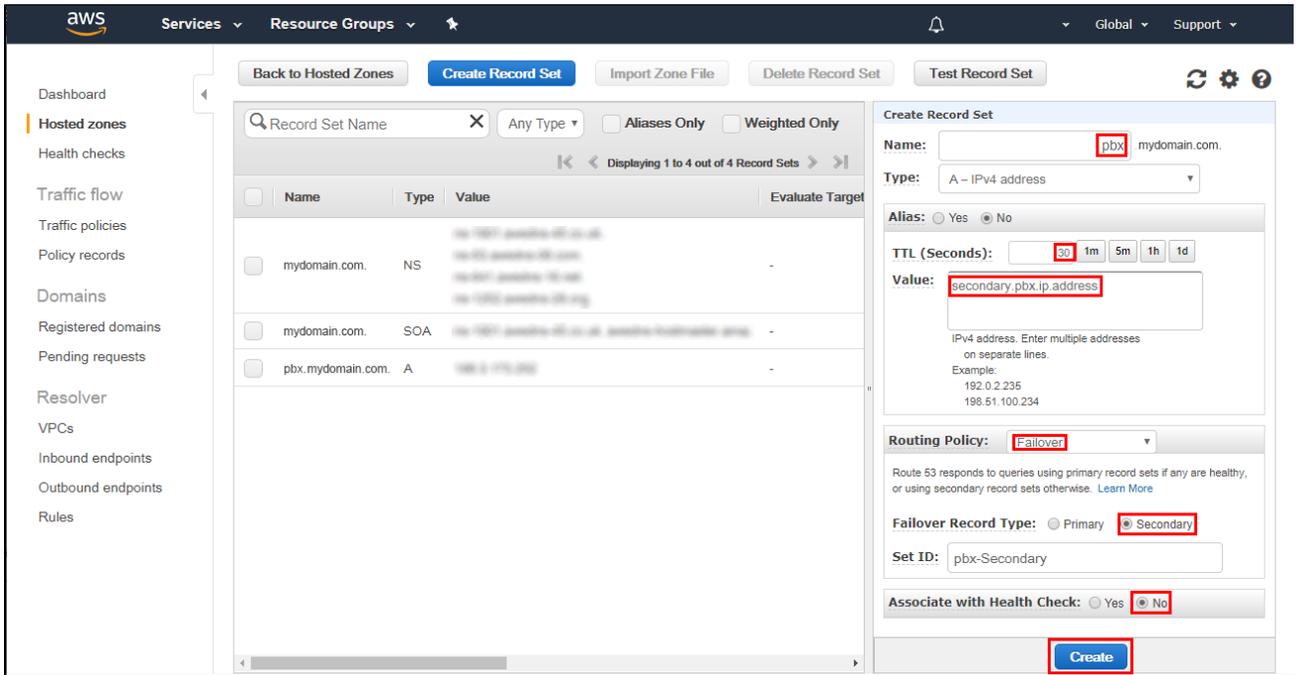
Rules



Add the main SIP server associating it with the Health check previously created



Add the secondary SIP server, this one is not associated with any Health check



Configurations on the main SIP server:

1. Open the firewall for the specific IP addresses Amazon AWS Route 53 uses for the Health checking of the SIP server. In a PBXact server it can be done by executing the following command in the Linux console as root user:

```
fwconsole firewall add trusted 15.177.0.0/18 54.183.255.128/26 54.228.16.0/26 54.232.40.64/26 54.241.32.64/26 54.243.31.192/26
54.244.52.192/26 54.245.168.0/26 54.248.220.0/26 54.250.253.192/26 54.251.31.128/26 54.252.79.128/26 54.252.254.192/26
54.255.254.192/26 107.23.255.0/26 176.34.159.192/26 177.71.207.128/26
```

For the current list of IP addresses Amazon AWS Route 53 uses for its Health checks search its [ip-ranges.json](#) file for "ROUTE53_HEALTHCHECKS" - Ref. <https://docs.aws.amazon.com/general/latest/gr/aws-ip-ranges.html>

2. fwconsole firewall stop
3. fwconsole firewall start

Conclusion

The configurations have been completed. For testing the failover you can easily force the main SIP server to go down. In a PBXact server, for example, this can be done by executing the following command in the Linux console as root user:

```
fwconsole stop
```

After approximately ~1-2 minutes (this can be changed by adjusting the "Request interval" and "Failure threshold" parameters inside the "Advanced configuration" section when creating the Health check, as shown above), the endpoints previously registered to the main SIP server will start failing over to the secondary SIP server. Please note that you may also need to adjust the value for the *SIP Registration Expiry timer* in your SIP endpoints to a lower value, to 30 seconds for example.

Amazon AWS Route 53 will automatically revert the IP address the Domain (FQDN) resolves to back to the main SIP server as soon as it detects, thanks to its Health check, that the main server has come back online again.

Related articles

Warm Spare