Bring Your Own IP Address to the Cloud

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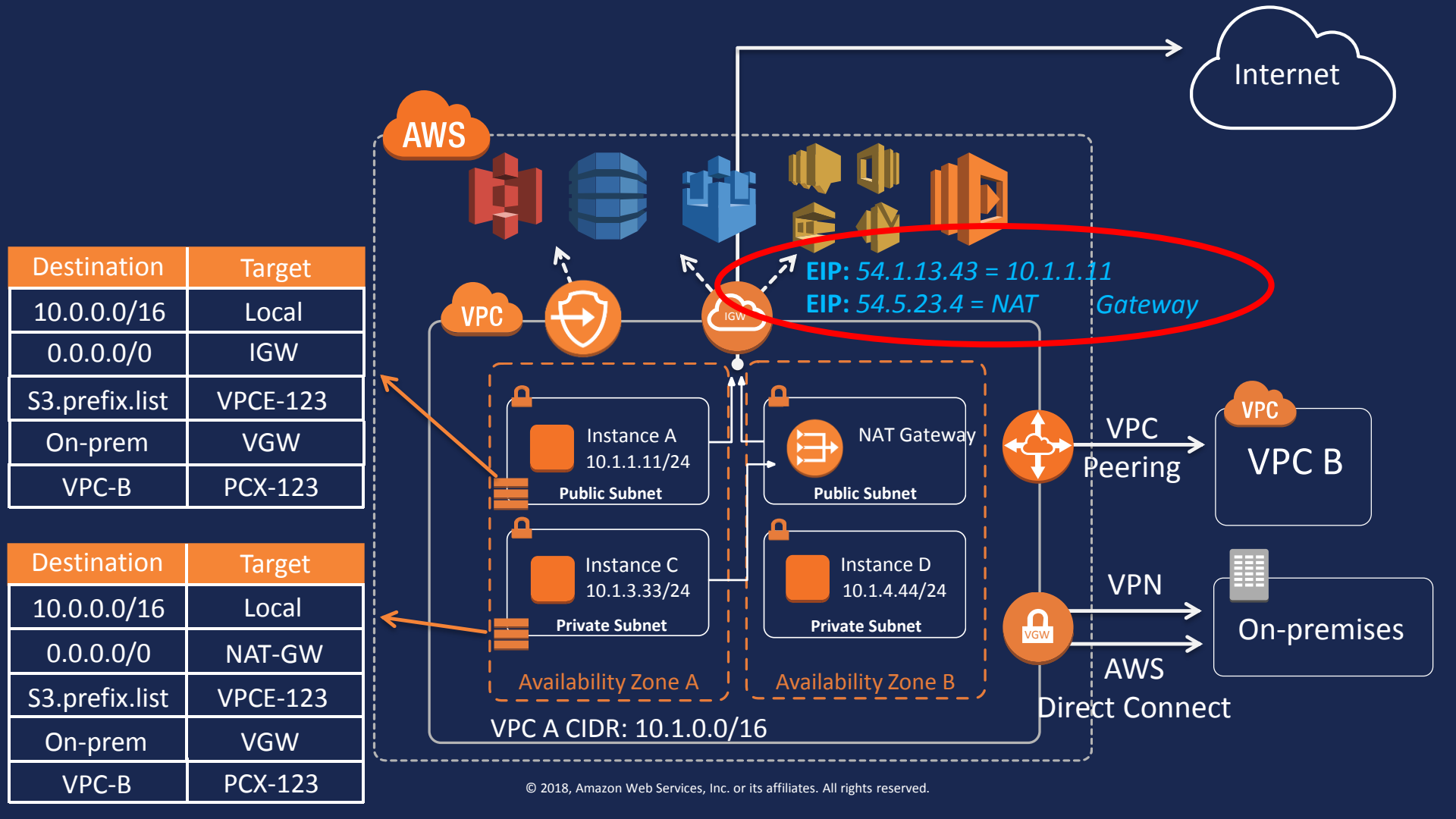
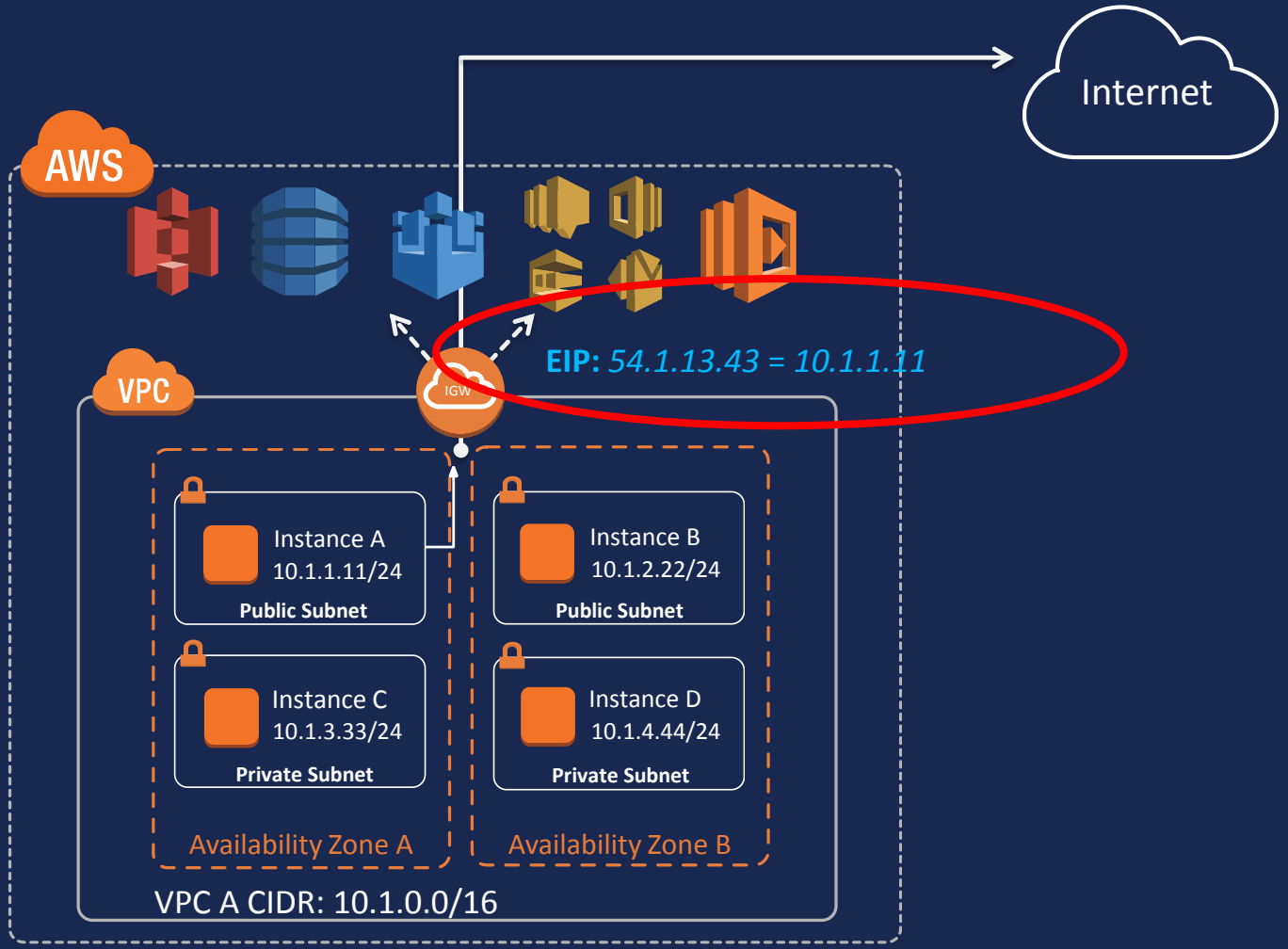
VPC foundations



Destination	Target
10.0.0.0/16	Local
0.0.0.0/0	IGW
S3.prefix.list	VPCE-123
On-prem	VGW
VPC-B	PCX-123

Destination	Target
10.0.0.0/16	Local
0.0.0.0/0	NAT-GW
S3.prefix.list	VPCE-123
On-prem	VGW
VPC-B	PCX-123

What is an Elastic IP?



Your IP address is not just a number

Your IP address is not just a number

Bring your own IP

EASILY MIGRATE TO AWS WITH YOUR PUBLIC ipv4 ADDRESSES

Keep your IP address reputation

Avoid changes to IP address whitelists

Move legacy applications with no need to change IP addresses

Why would you want to bring your own IP? (BYOIP)

IP reputation

Your IP reputation is how you are perceived on the public internet

Whitelisting

Tell your friends who you are at an IP level, and know this doesn’t need to change

Migration

Avoid IP address changes to applications when you migrate to the AWS Cloud

Redundancy

Hot standby for your on-premises

This is great!

Let’s talk about the process

What do I need to start?

The address range must be registered with your regional internet registry (RIR).

Supported RIRs include the American Registry for Internet Numbers (ARIN) and RIPE.

Preparing you IP range:

Authorization

1. Create an ROA to authorize Amazon ASNs 16509 and 14618 to advertise your address range.

What is a Route Origin Authorization?

"A ROA is a cryptographically signed object that states which Autonomous System (AS) is authorized to originate a particular IP address prefix or set of prefixes. ROAs may only be generated for Internet number resources covered by your resource certificate." **- ARIN**

Where can I get a ROA?

ARIN:

https://www.arin.net/resources/rpki/roarequest.html

RIPE:

https://www.ripe.net/manage-ips-and-asns/resource-management/certification/resource-certification-roa-management

Preparing you IP range:

Authorization

1. Create an ROA to authorize Amazon ASNs 16509 and 14618 to advertise your address range.

Preparing you IP range:

Authentication

2. Generate an RSA 2048-bit key pair

openssl genrsa -out private.key 2048

Preparing you IP range:

Authentication

3. Create a public X509 certificate from the key pair using the following command

openssl req -new -x509 -key private.key -days 365 | tr -d "\n" > publickey.cer

Preparing you IP range:

Authentication

4. Create a signed message. The format of the message is as follows:

1|aws|account|cidr|YYYYMMDD|SHA256|RSAPSS

1|aws|account|cidr|YYYYMMDD|SHA256|RSAPSS

1. Version – Should always be 1
2. AWS Partition. *Valid values* – aws, aws-cn, aws-iso, aws-iso-b, aws-us-gov
3. 12-digit AWS Account Number
4. CIDR being brought – should follow standard CIDR notation
5. Expiration date in ISO 8601 format (YYYYMMDD). The signature will no longer be valid after this date 00:00:00 UTC.
6. Hashing algorithm, Must be SHA256. (Might support more in the future)
7. RSAPSS (Might support more in the future)

Preparing you IP range:

Authentication

4. (Continued). The following command signs the message using the key pair you created and saves it as base64_urlsafe_signature:

```
echo "1|aws|123456789012|198.51.100.0/24|20191201|SHA256|RSAPSS" | tr -d "\n" | openssl dgst -sha256 -sigopt rsa_padding_mode:pss -sigopt rsa_pss_saltlen:-1 -sign private.key -keyform PEM | openssl base64 | tr -- '+=/' '-_~' | tr -d "\n" > base64_urlsafe_signature
```

Preparing you IP range:

Authentication

5. Update the RDAP record for your RIR with the X509 certificate.

Be sure to copy the -----BEGIN CERTIFICATE----- and -----END CERTIFICATE----- from the certificate.

Preparing you IP range:

Authentication

To view your certificate, run the following command:

```
cat publickey.cer
```

For ARIN, add the certificate in the "Public Comments" section for your address range.

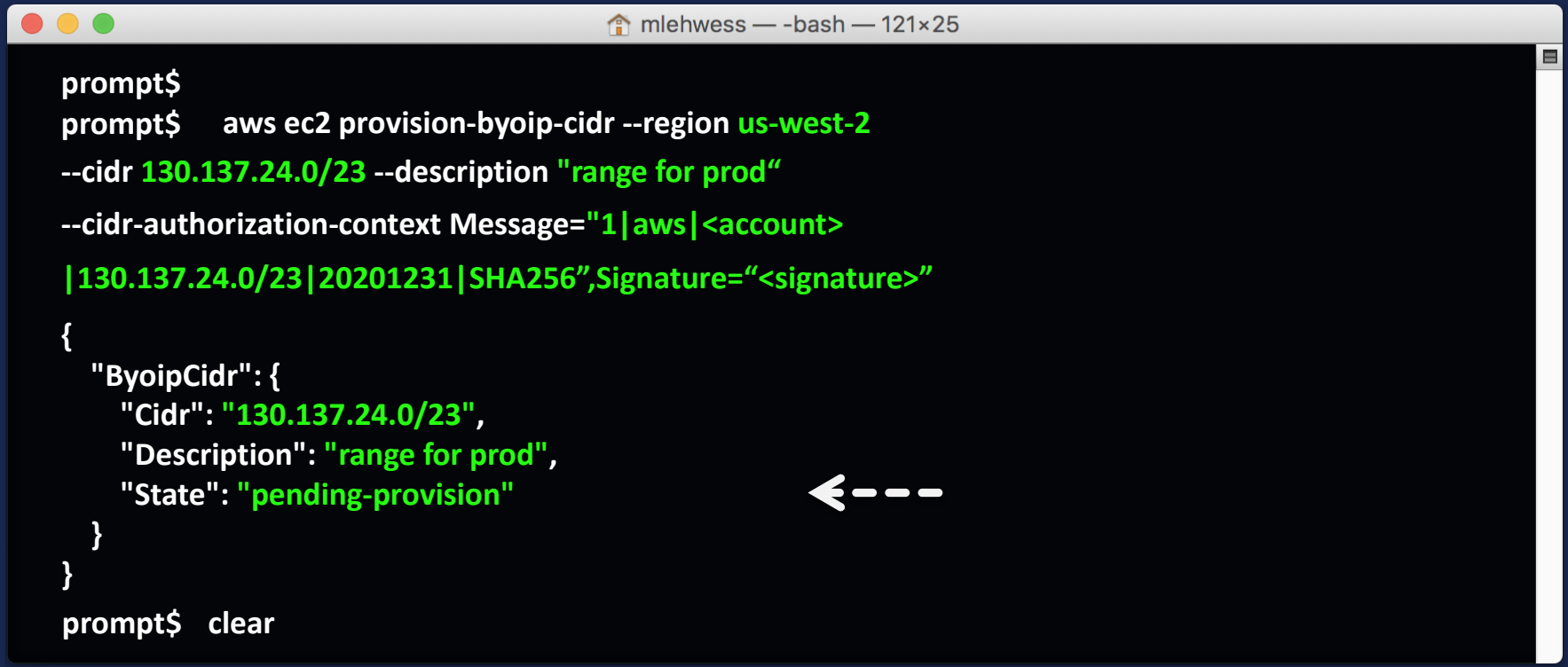
For RIPE, add the certificate as a new "desc" field for your address range.

Provisioning your IP Range

Where the rubber hits the road…

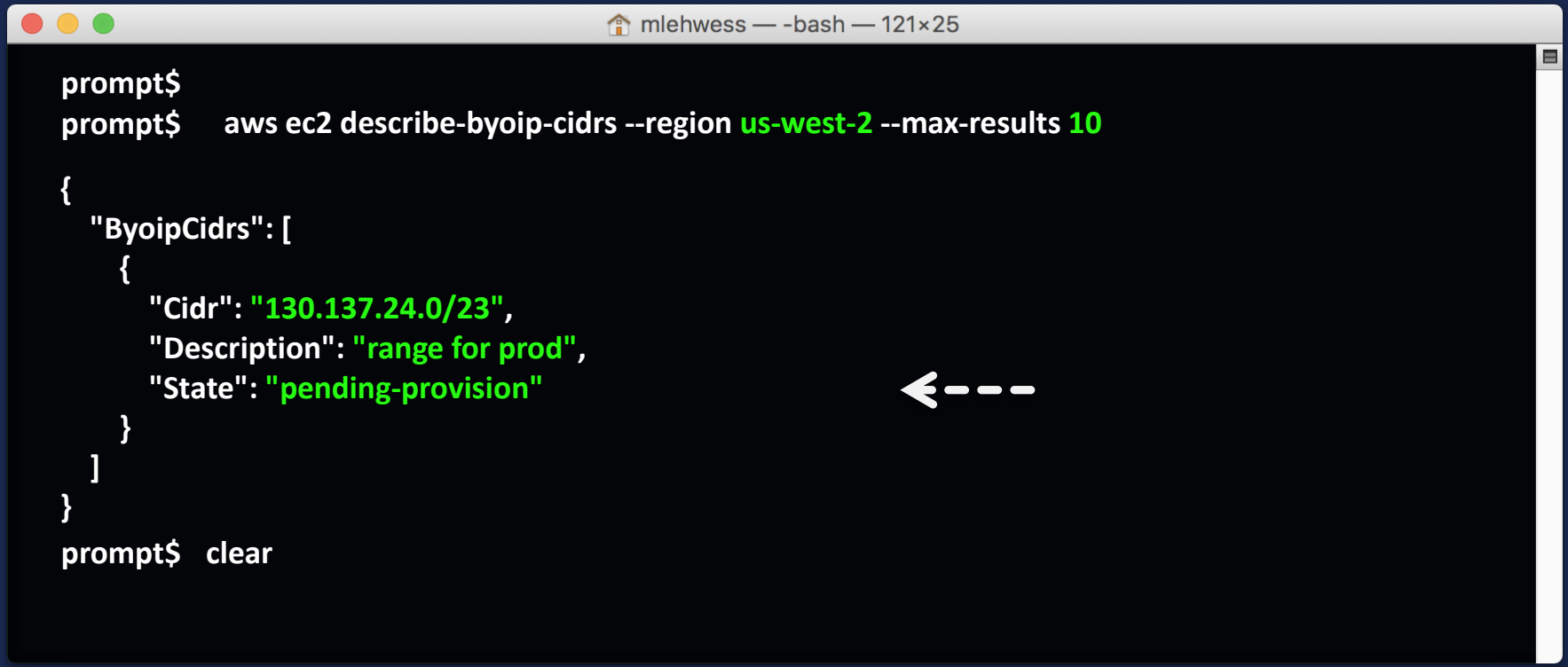
Provisioning your IP Range

Provisioning with provision_byoip_cidr



Provisioning your IP Range

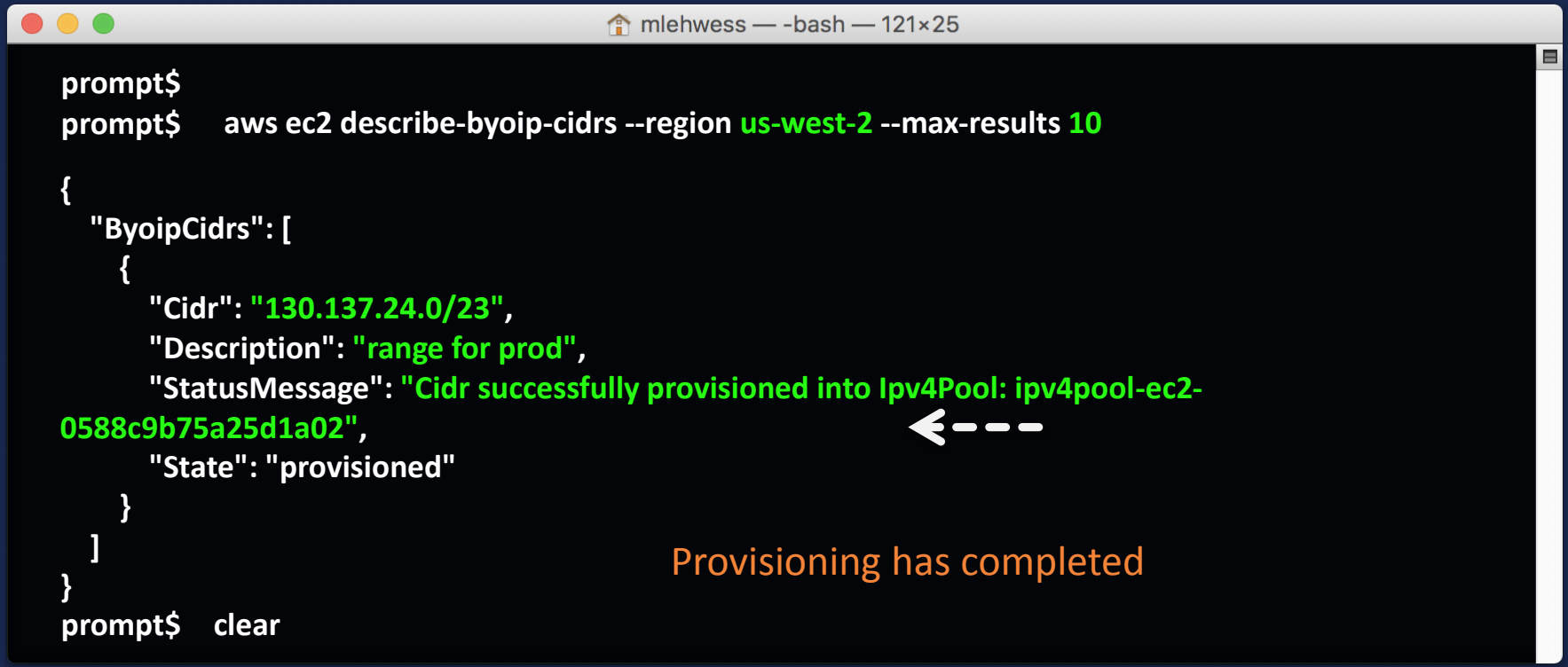
Monitoring status using describe-byoip-cidrs



Provisioning your IP Range

Monitoring status using describe-byoip-cidrs

… sometime later



Advertising your IP Range

Advertisement of the address range by Amazon

Creating an Amazon Elastic IP

First, use describe-public-ipv-4-pools

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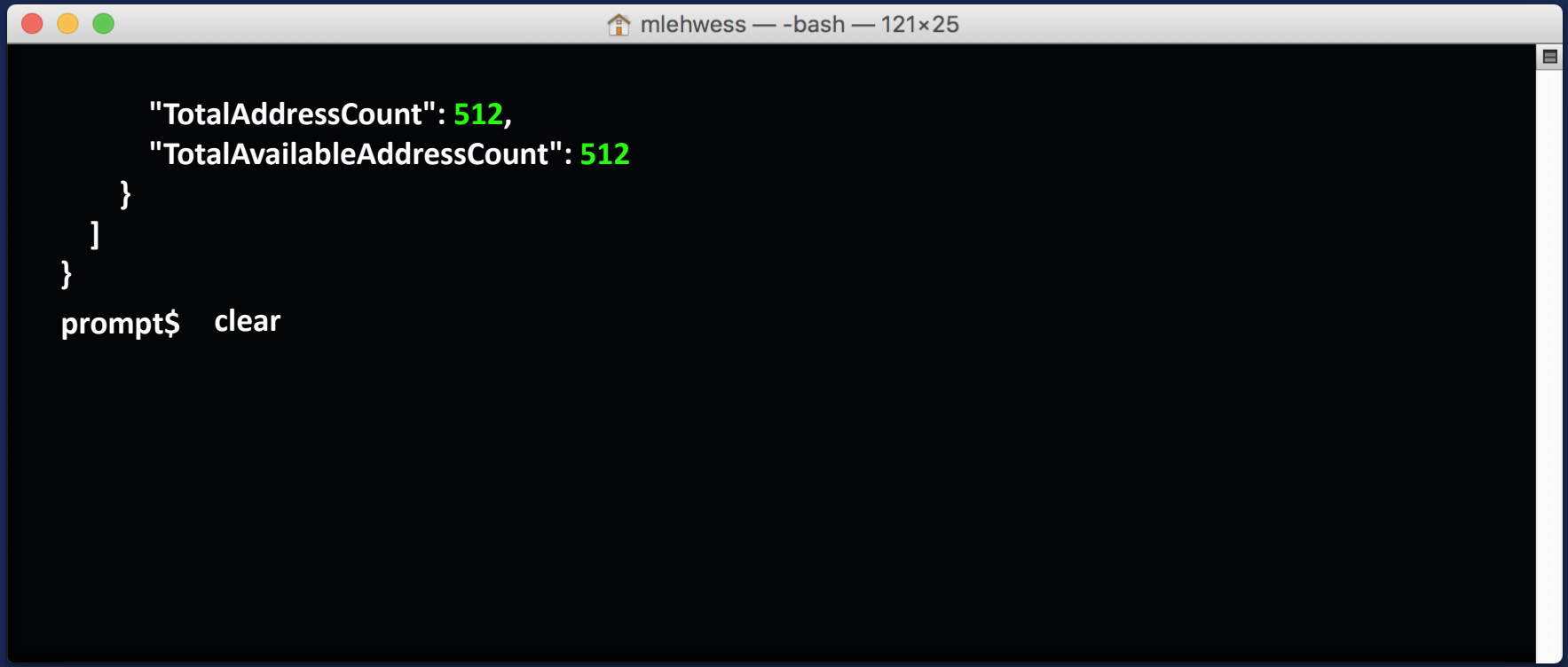
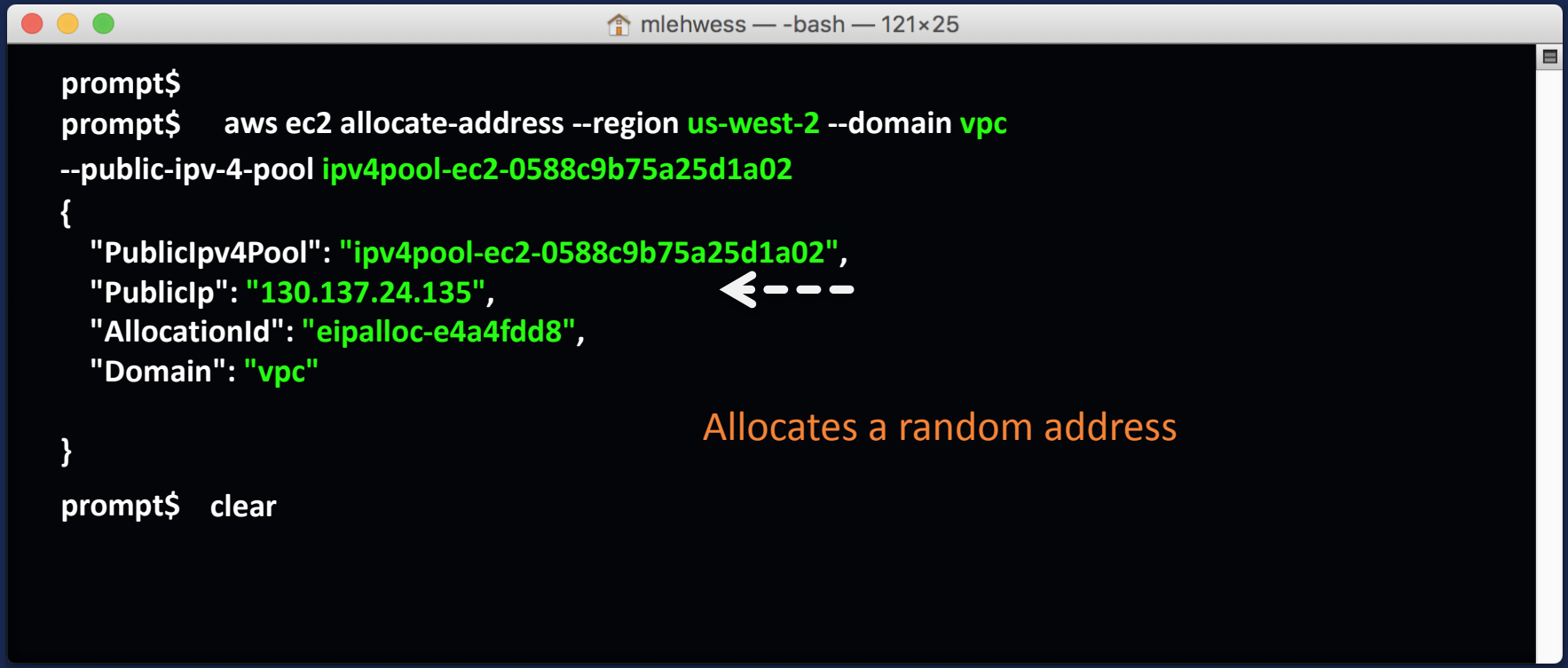


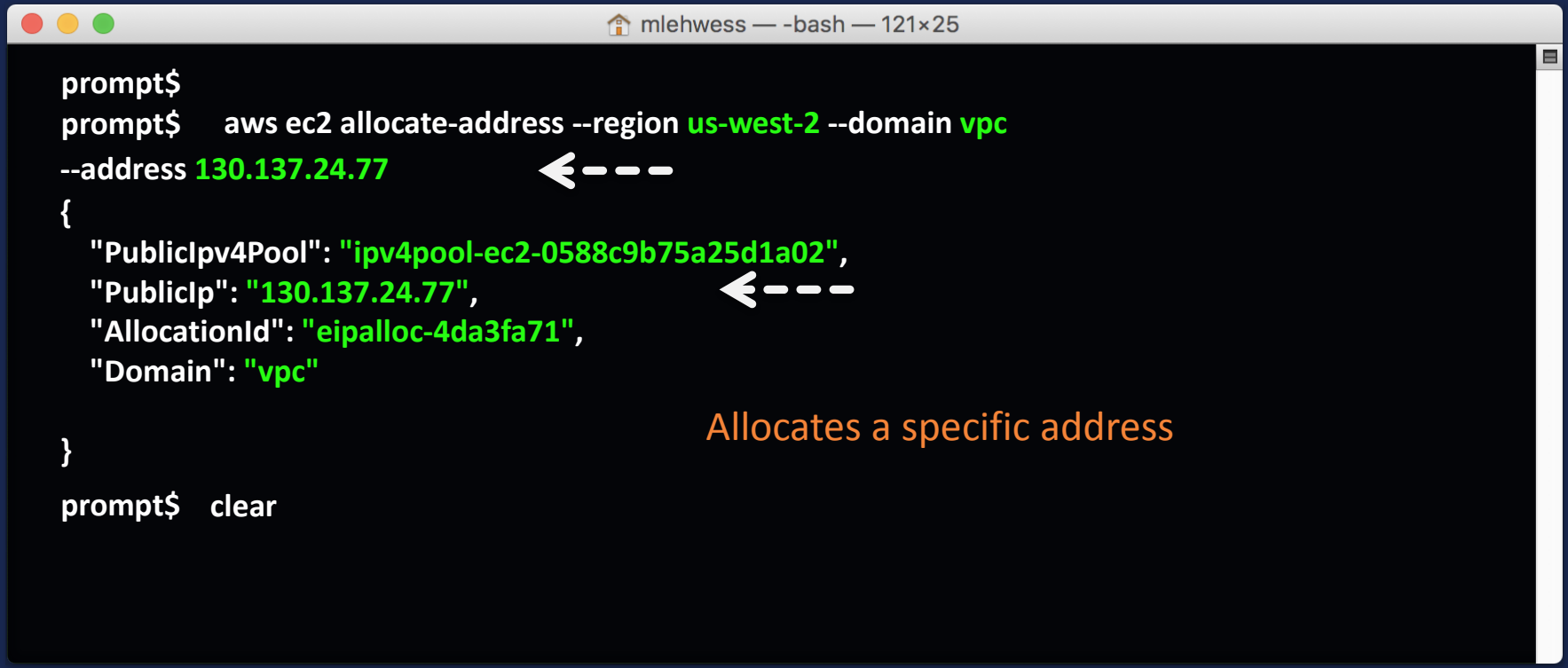
Creating an Amazon Elastic IP

Next, use allocate-address (random)



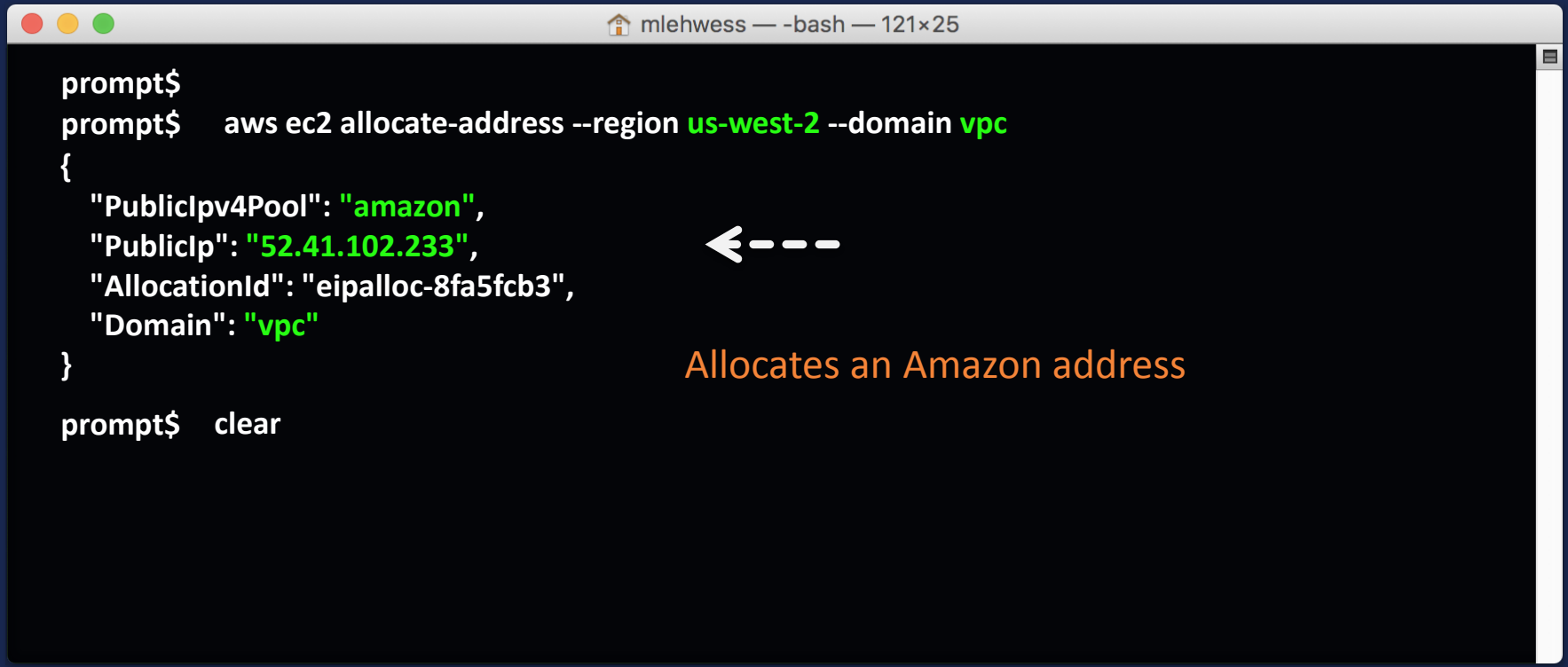
Creating an Amazon Elastic IP

Next, use allocate-address (specific)



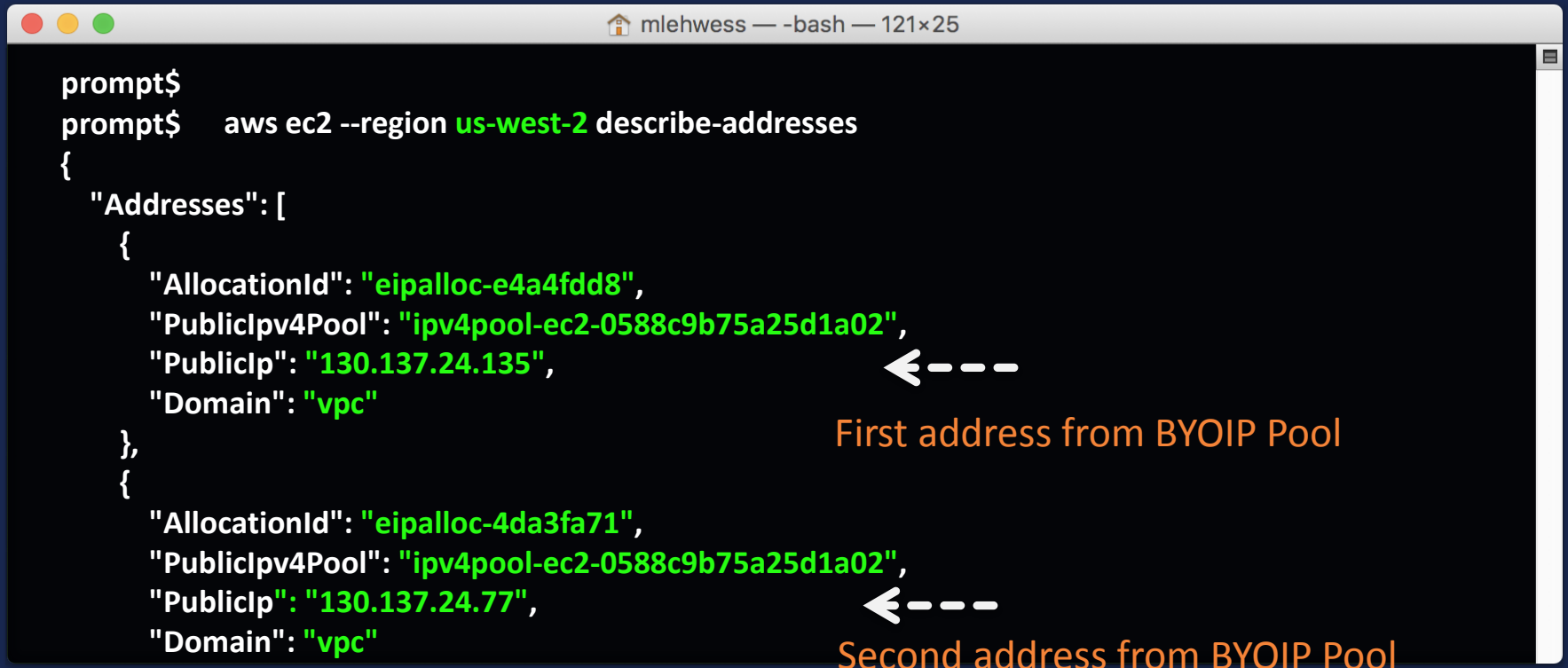
Creating an Amazon Elastic IP

Next, use allocate-address (Amazon)



Creating an Amazon Elastic IP

Describe now shows 2 addresses from the pool and 1 from Amazon



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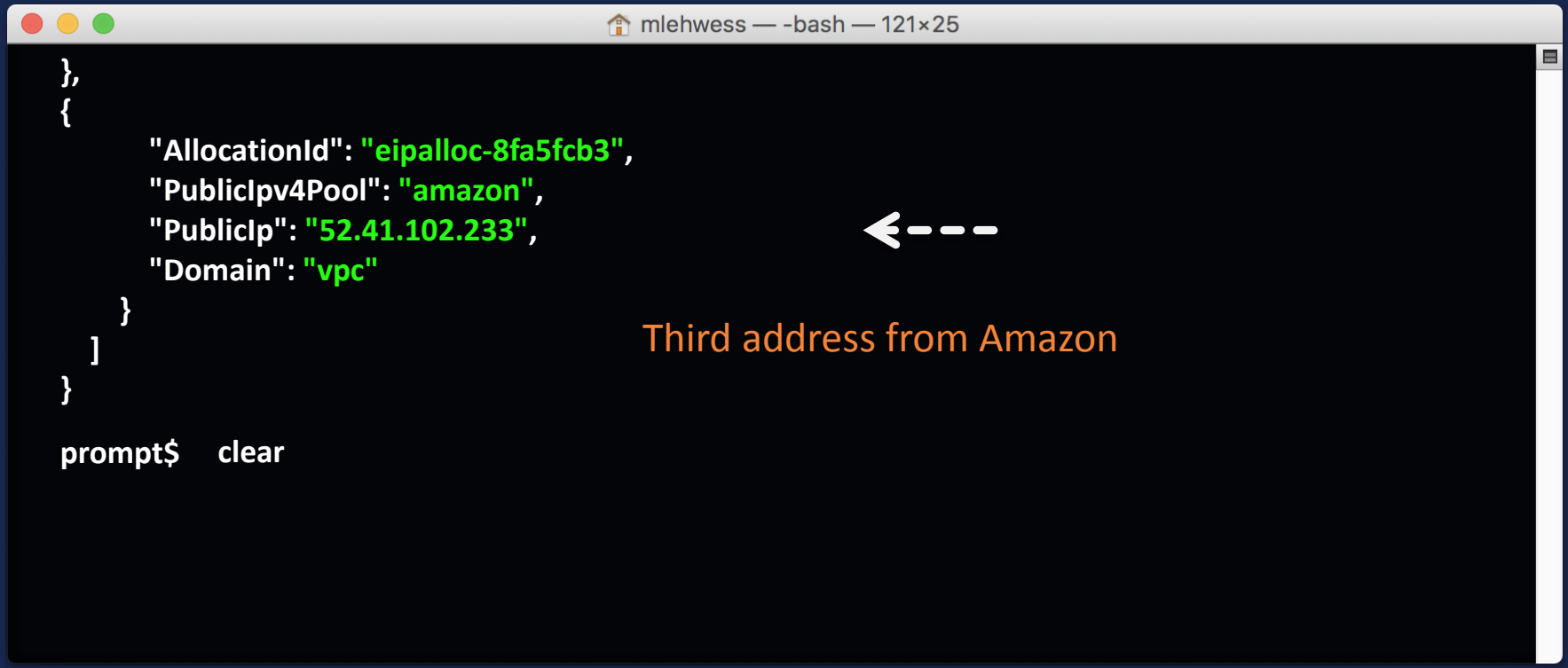


Creating an Amazon Elastic IP

Describing just the pool, shows only two addresses used

mlehwess — -bash — 121×25

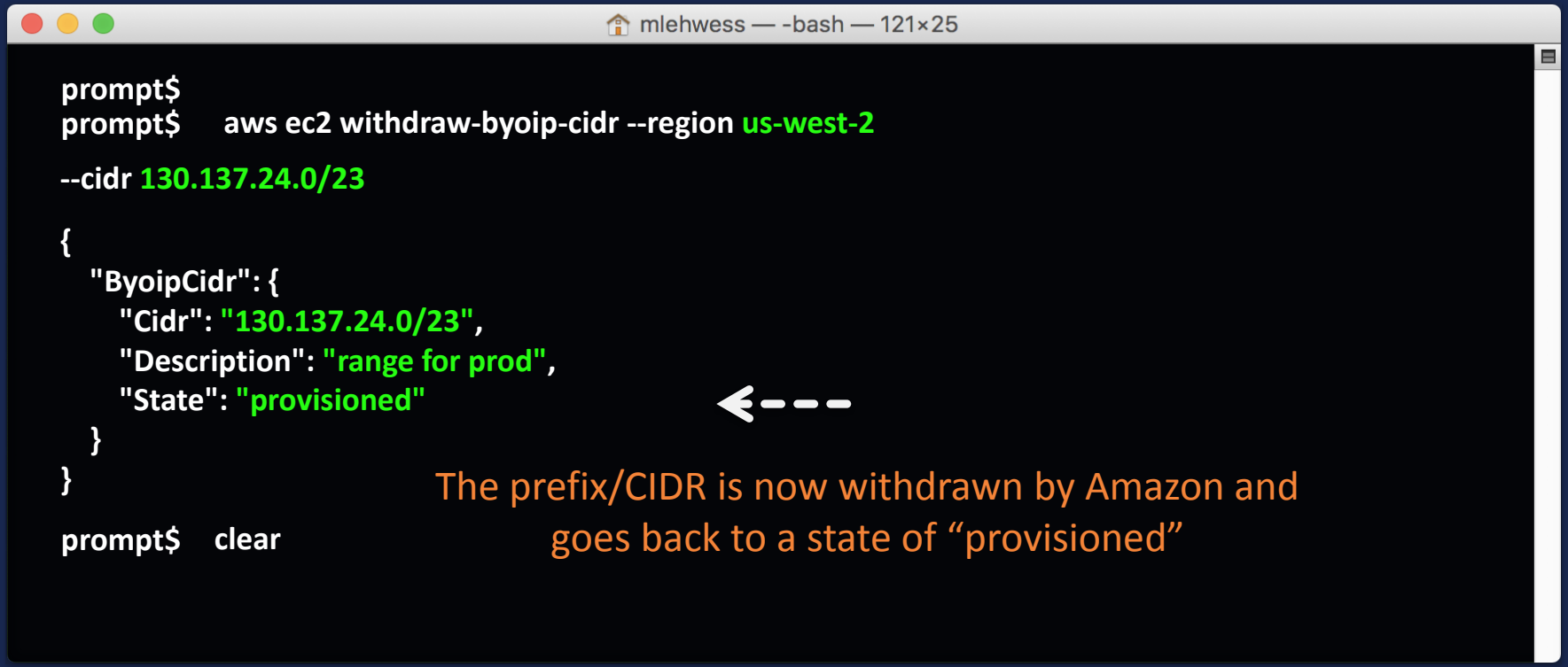
```
prompt$
prompt$     aws ec2 describe-public-ipv4-pools
{
    "PublicIpv4Pools": [
        {
            "PoolId": "ipv4pool-ec2-0588c9b75a25d1a02",
            "Description": "range for prod",
            "PoolAddressRanges": [
                {
                    "FirstAddress": "130.137.24.0",
                    "LastAddress": "130.137.25.255",
                    "AddressCount": 512,
                    "AvailableAddressCount": 510
                }
            ],
```

Creating an Amazon Elastic IP

Describing just the pool, shows only two addresses used

Withdraw Advertisement

Withdrawing the advertisement of the address range by Amazon



Deprovisioning Address Range

After deallocating all EIPs from the pool

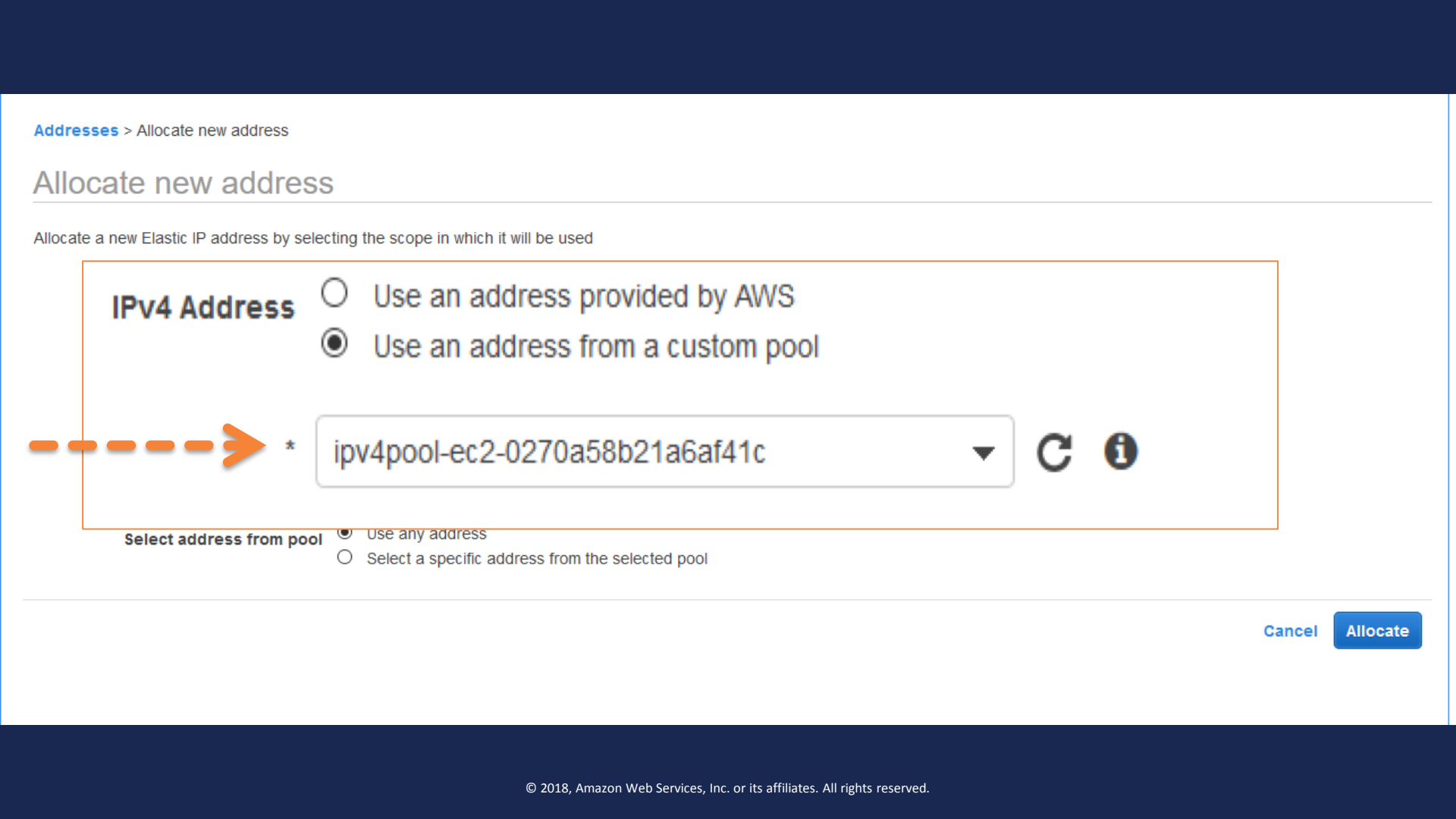
mlehwess — -bash — 121×25

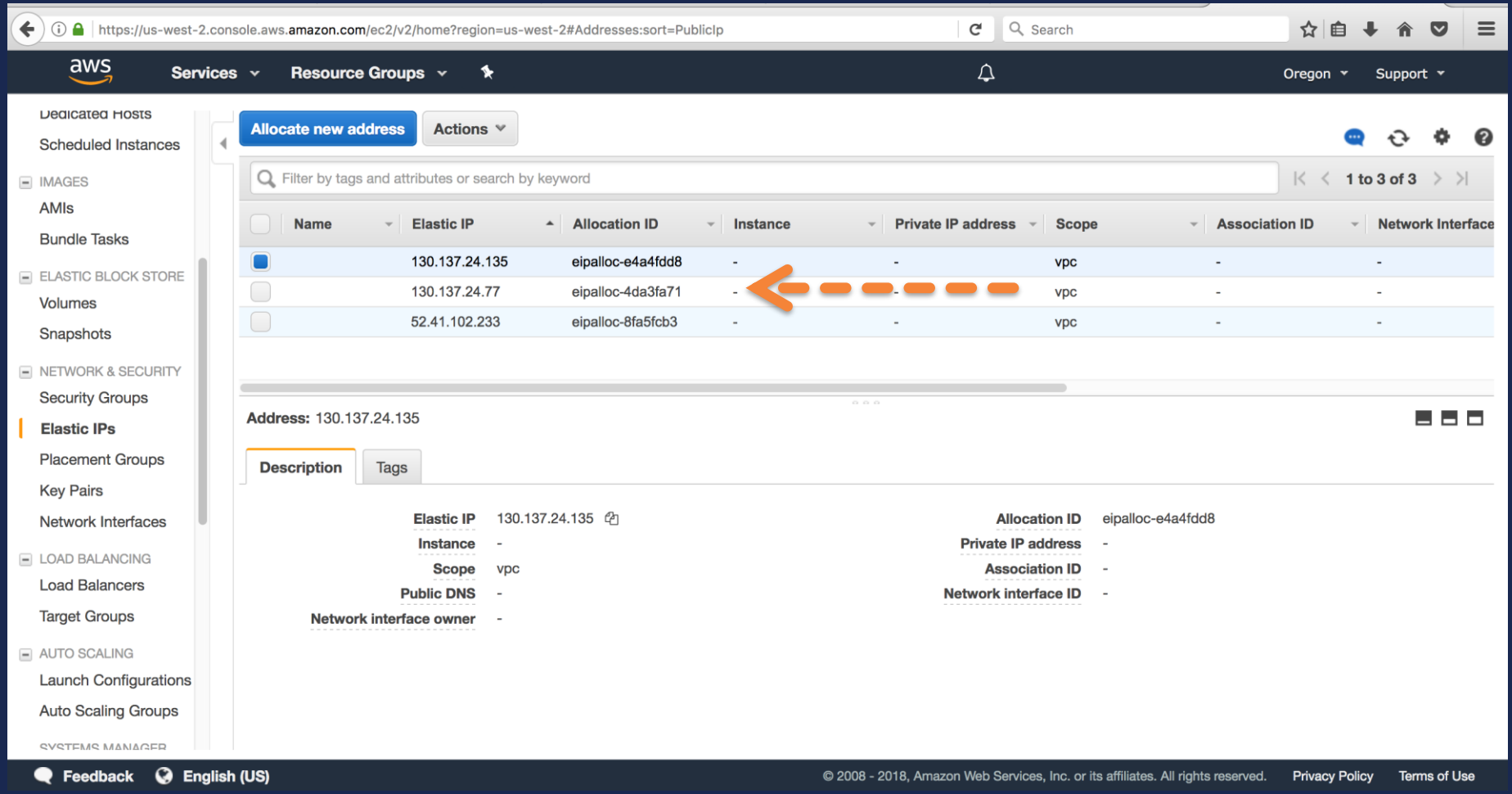
```
prompt$
prompt$     aws ec2 deprovision-byoip-cidr --region us-west-2
--cidr 130.137.24.0/23

{
   "ByoipCidr": {
      "Cidr": "130.137.24.0/23",
      "Description": "range for prod",
      "State": "pending-deprovision"
   }
}
prompt$    clear
```

The prefix/CIDR is now “pending-deprovisioning”

Let’s checkout the console

cool.





What more do I need to know?

What the most specific prefix I can bring via BYOIP?

The most specific prefix you can bring via BYOIP is a /24 IPv4 prefix.

Can I move a CIDR between regions?

Yes you can.

You will have to de-provision your CIDR from one region and provision it to the other.

Will the CIDRs on-boarded in preview work when you go public?

Yes, they will continue to work with no interruption.

The CIDRs you on-boarded during the preview will work exactly like CIDRs on-boarded after the feature is public.

Thank you!

prompt$ clear