API Security Project

KICK OFF

Project Leaders

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- Research Group Lead @ Checkmarx
- Focusing on Application Security
- Strong believer in spreading security awareness

Inon Shkedy

- Head of Research @ Salt Security
- 7 Years of research and pentesting experience
- I’ve grown up with APIs

Today's Agenda

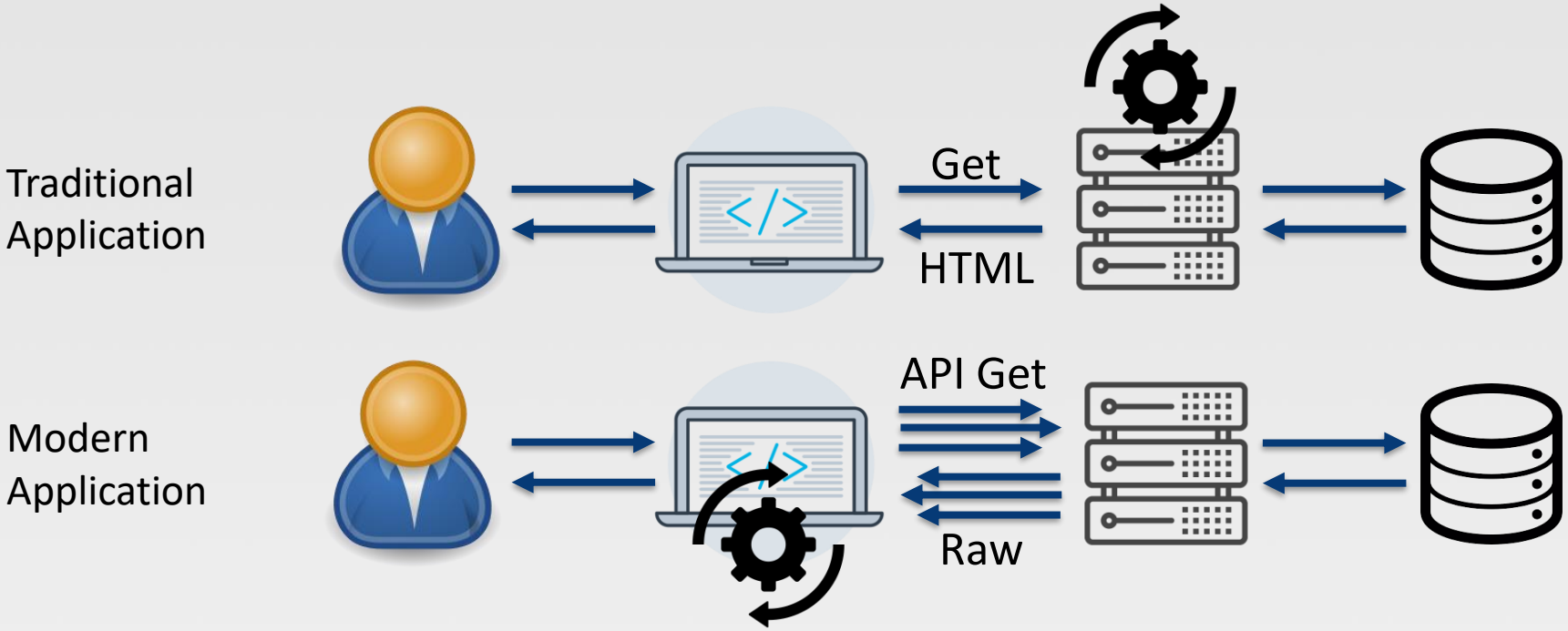
- How APIs based apps are different? Deserve their own project?
- Roadmap
- Creation process
- API Security Top 10
- Acknowledgements
- Call for contributors

How API Based Apps are Different?

Client devices are becoming stronger

Logic moves from Backend to Frontend
(together with some vulnerabilities)

Traditional vs. Modern



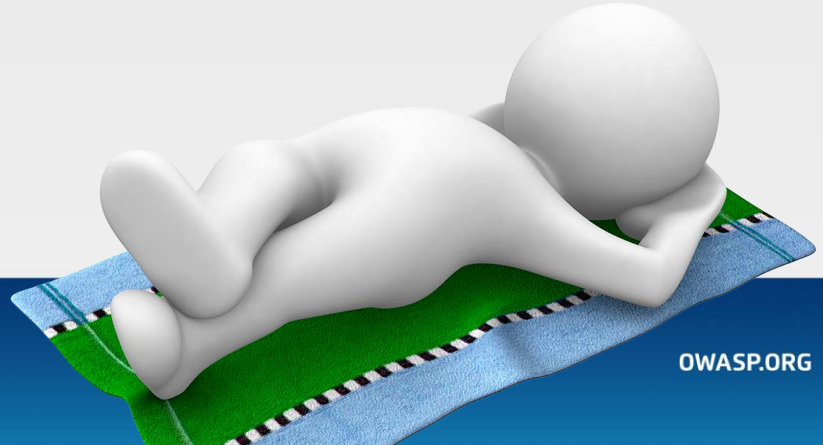
How API Based Apps are Different?

- The server is used more as a proxy for data
- The rendering component is the client, not the server

- Clients consume raw data
- APIs expose the underlying implementation of the app
- The user's state is usually maintained and monitored by the client
- More parameters are sent in each HTTP request (object ID's, filters)

How API Based Apps are Different?

- The REST API standard
  - Standardized & generic
  - Predictable entry points
  - One entry point (URL) can be used for multiple purposes



How API Based Apps are Different?

Traditional vulnerabilities are less common in API based apps:

- SQLi – Increasing use of ORMs
- CSRF – Authorization headers instead of cookies
- Path Manipulations – Cloud based storage
- Classic IT Security Issues - SaaS

Roadmap – Planned Projects

- API Secrity Top 10
- API Security Cheat Sheet
- crAPI (**C**ompletely **R**idiculous **API**
  - an intentionally vulnerable API project)

Roadmap

	Top 10	Cheat Sheet	crAPI
2019 Q1	Prepare		
2019 Q2	Kick-Off	Prepare	
2019 Q3	RC	Kick-Off	Prepare
2019 Q4	V1.0	Collaborate	Kick-Off
2020 Q1		V1.0	Collaborate
2020 Q2			V1.0

The creation process of the Top10

- Internal knowledge and experience
- Internal data collection (Bug bounties reports, published incidents, etc.)
- Call for Data
- Call for comments

API Security Top 10

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

A1: Broken Object Level Access Control

- APIs consume a lot of object IDs by design:
  - URL params (/api/users/**717**) / Query Params (/download_file?id=**111**)
  - Body params / HTTP Headers (user-id:**717**)
- Old “tricks” don’t work in APIs
  - Viewstate
  - The client-side maintain the user’s state
- Known also as:
  - IDOR
  - Forceful Browsing
  - Parameter Tampering
  - Broken Authorization

A2: Broken Authentication

- As in OWASP TOP 10 2017 - A2

A3: Improper Data Filtering

- Client-side data filtering
  APIs tend to return more data than required.
  This data is usually now shown to the user, but can be easily sniffed by a web proxy

- Filters manipulation
  The FE usually maintains the user's state.
  The client sends more filters to the BE in order to reflect the user's state.

A4: Lack of Resources & Rate Limiting

- Might lead to DOS, Brute force attack

A5: Missing Function/Resource Level Access Control

- As in OWASP TOP 10 2013 - A7
- Popular in APIs because:
  - Easier to predict the entry points (GET → **DELETE**) (/api/v1/users → api/v1/**admins**)
  - Complex user policies and roles

Sensitive Resource
GET /api/v1/**financial_reports**

Sensitive Function
GET /api/v1/users/**export_all**

A6: Mass Assignment

- Modern frameworks encourage developers to use mass assignment techniques

NodeJS:

```
var user = new User(req.body);
user.save();
```

Rails:

```
@user = User.new(params[:user])
```

- Easier to exploit in APIs
  - We can usually can find a GET request that returns all the properties of an object

A7: Security Misconfiguration

- Improper CORS
- Unnecessary HTTP methods
- Detailed Errors

A8: Injection

- The most common inject flow (SQLi) is becoming less and less common because of ORMs
- Same as A1 - OWASP TOP TEN 2017

A9: Improper Assets Management

- CI/CD → APIs change all the time:
  - Lack of documentation
- Cloud + Deployment automation (k8s) → super easy to deploy APIs
  - Shadow APIs
  - Application servers / full environments that have been forgotten

A10: Insufficient Logging & Monitoring

- Same as A10 - OWASP TOP 10 2017

Acknowledgements

Current Draft Creation

Checkmarx – Erez Yalon, David Sopas, Paulo Silva

SALT Security – Inon Shkedy, Chris Westphel

Reviewers

42Crunch - Matthieu Estrade

Imperva - Ziv Grinberg

Shay Chen

Philippe De Ryck

Stefan Mantel

Sagar Popat

<YOUR NAME HERE>

Call for Discussions

Mailing List

https://groups.google.com/a/owasp.org/d/forum/api-security-project

Call for Contributions

GitHub Project

https://github.com/OWASP/API-Security/blob/develop/CONTRIBUTING.md

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