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THREAT MODEL WORKSHOP

FAST TRACK

https://threatmodel.co.uk

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WHAT IS A THREAT MODEL?

CYBER SECURITY HYGIENE

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OBJECTIVES OF A THREAT MODEL

IDENTIFY

- potential vulnerabilities and/or threats

DESCRIBE

- counter-measures to mitigate risk

PRIORITISE

- resources to maximise system security

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OBJECTIVES OF A THREAT MODEL

DOCUMENTING RISK

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THE VALUE PROPOSITION: RISK MITIGATION

REPUTATION

- loss of customer confidence and trust; a weakened brand

OPERATIONS

- disruption of business operations

FINANCIAL

- loss of earnings, fines & restitution

GOVERNANCE & COMPLIANCE

- GDPR, Data Protection Act 2008, ISO27001 et. al.

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JUST LIKE THE FUNCTIONAL, DESIGN AND TEST SPECS, A THREAT MODEL IS A LIVING DOCUMENT — AS YOU CHANGE THE DESIGN, YOU NEED TO GO BACK AND UPDATE YOUR THREAT MODEL TO SEE IF ANY NEW THREATS HAVE ARISEN SINCE YOU STARTED.

Larry Osterman, Microsoft

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THREAT MODELLING

DOCUMENTING RISK

https://threatmodel.co.uk

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FUNDAMENTAL QUESTIONS: ASK YOURSELF

- What are we working on?
- What can go wrong?
- What are we going to do about it?
- Did we do a good job?

Adapted from "Application Threat Modelling" by **OWASP**
https://owasp.org/www-community/Application_Threat_Modeling

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THREAT MODELLING: A PROCESS

IDENTIFY

- Using **DATA FLOW DIAGRAMS**

CLASSIFY

- Using **S.T.R.I.D.E** and **ATTACK TREES**

QUANTIFY

- Using **D.R.E.A.D** methodology

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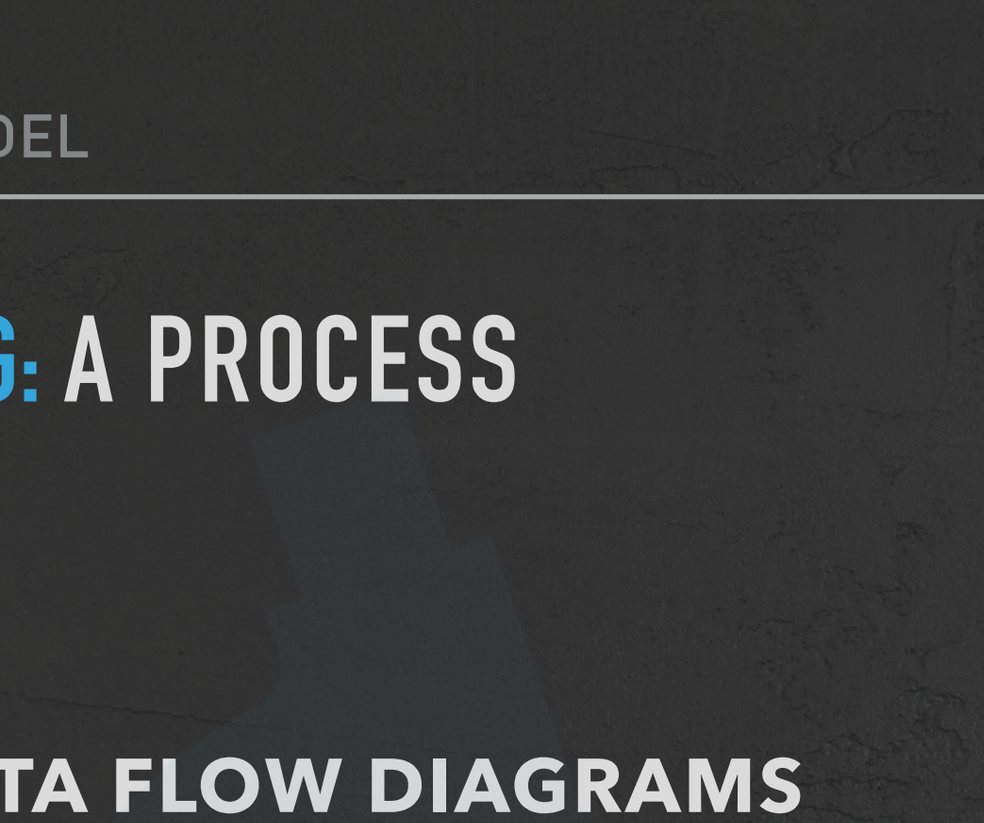
THREAT MODELLING: A PROCESS

IDENTIFY

- Using **DATA FLOW DIAGRAMS**



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CLOUD
DATA BUCKET

1. STORE
DATA

IOT
DEVICE

TRUST BOUNDARY
#1

3. FETCH DATA

TRUST BOUNDARY
#2

2. REQUEST
DATA

API
GATEWAY

MOBILE
CLIENT

4. RETURN
DATA

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THREAT MODELLING: A PROCESS

IDENTIFY

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THE S.T.R.I.D.E. METHODOLOGY

- **S** POOFING
- **T** AMPERING
- **R** EPUDIATION
- **I** NFORMATION (disclosure)
- **D** ENIAL (of service)
- **E** LEVATION (of privilege)

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THE S.T.R.I.D.E. METHODOLOGY

- **S** POOFING

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THE S.T.R.I.D.E. METHODOLOGY

SPOOFING

- FRAUDULENT OR MISLEADING DATA
- IMPERSONATING LEGITIMATE USERS
- PRETENDING TO BE SOMETHING IT ISN'T

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THE S.T.R.I.D.E. METHODOLOGY

- **S** POOFING
- **T** AMPERING

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THE S.T.R.I.D.E. METHODOLOGY

TAMPERING

- UNAUTHORISED CHANGES TO DATA
- MAN-IN-THE-MIDDLE (MITM) ATTACKS
- INTERFERING WITH DATA INTEGRITY

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THE S.T.R.I.D.E. METHODOLOGY

- **S** POOFING
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THE S.T.R.I.D.E. METHODOLOGY

REPUDIATION

- IS THERE AN AUDIT TRAIL?
- ATTACKER HIDING THEIR ACTIVITY
- PREVENTED LOGGING OF USER ACTIONS

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THE S.T.R.I.D.E. METHODOLOGY

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THE S.T.R.I.D.E. METHODOLOGY

INFORMATION DISCLOSURE

- ✦ DATA TRANSMITTED UNENCRYPTED
- ✦ LEAKING OF PERSONAL DATA (PII)
- ✦ INADEQUATE ACCESS CONTROL LIST (ACL)

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THE S.T.R.I.D.E. METHODOLOGY

DENIAL OF SERVICE (DOS)

- INACCESSIBLE PRODUCTS OR SERVICES
- RESOURCE EXHAUSTION
- REDUCED PERFORMANCE

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THE S.T.R.I.D.E. METHODOLOGY

ELEVATION OF PRIVILEGE

- BUGS, EXPLOITS AND MISCONFIGURATION INCREASING A USER'S ACCESS LEVEL
- USERS BEING ABLE TO ACCESS SERVICES OR RESOURCES WHICH THEY SHOULDN'T

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THE S.T.R.I.D.E. METHODOLOGY

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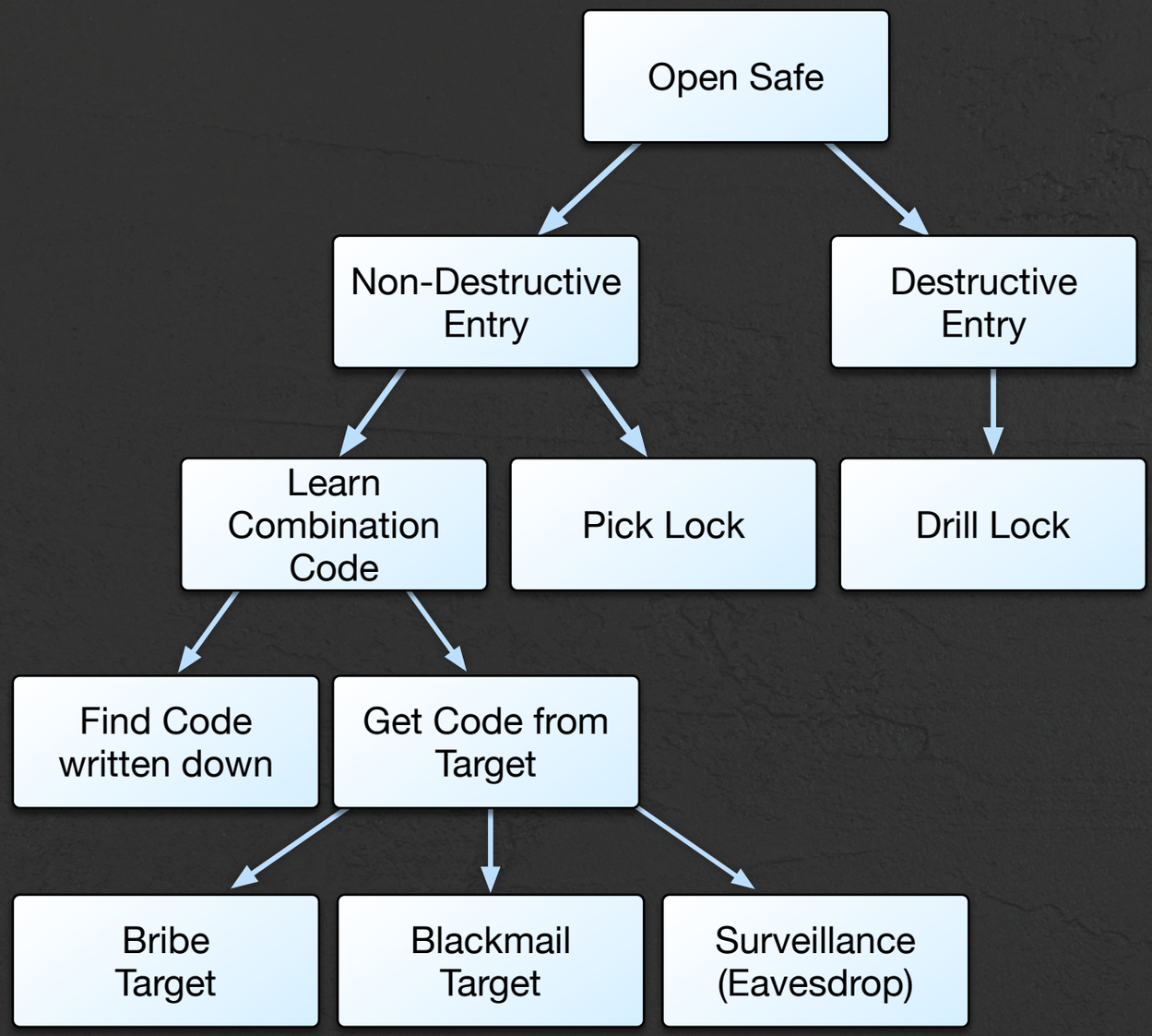
THE ATTACK TREE METHODOLOGY



Adapted from “Attack Trees” by **Bruce Schneier**, Dr. Dobb's Journal, 1999

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THE D.R.E.A.D. RISK ASSESSMENT

- **D AMAGE**
- **R EPRODUCIBILITY**
- **E XPLOITABILITY**
- **A FFECTED** (users)
- **D ISCOVERABILITY**

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THE D.R.E.A.D. RISK ASSESSMENT

D AMAGE

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THE D.R.E.A.D. RISK ASSESSMENT

DAMAGE

- HOW BAD WOULD AN ATTACK BE?
- FROM THE BUSINESS AND SERVICE PERSPECTIVES

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THE D.R.E.A.D. RISK ASSESSMENT

- **D AMAGE**
- **R EPRODUCIBILITY**

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THE D.R.E.A.D. RISK ASSESSMENT

REPRODUCIBILITY

- HOW EASY IS IT TO REPRODUCE?
- IS IT PREDICTABLE OR UNPREDICTABLE?
- ARE THERE OTHER FACTORS REQUIRED?

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THE D.R.E.A.D. RISK ASSESSMENT

- **D** AMAGE
- **R** EPRODUCIBILITY
- **E** XPLOITABILITY

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THE D.R.E.A.D. RISK ASSESSMENT

EXPLOITABILITY

- ✦ HOW EASY IS IT TO EXPLOIT?
- ✦ IS EXPLOITING SIMPLE OR COMPLEX?
- ✦ REQUIRES MULTIPLE VULNERABILITIES?

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THE D.R.E.A.D. RISK ASSESSMENT

- **D AMAGE**
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- **A FFECTED** (users)

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THE D.R.E.A.D. RISK ASSESSMENT

AFFECTED USERS

- HOW MANY USERS WILL IT IMPACT?
- DOES IT AFFECT ONLY SERVICE USERS?

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THE D.R.E.A.D. RISK ASSESSMENT

- **D AMAGE**
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- **D ISCOVERABILITY**

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THE D.R.E.A.D. RISK ASSESSMENT

DISCOVERABILITY

- HOW EASY IS IT TO DISCOVER THE VULNERABILITY?
- EXPOSED CONFIGURATION INFORMATION

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THE D.R.E.A.D. RISK ASSESSMENT

- **D AMAGE**
- **R EPRODUCIBILITY**
- **E XPLOITABILITY**
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- **D ISCOVERABILITY**

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IT IS NEVER TOO LATE AND IT IS NEVER TOO EARLY TO DOCUMENT RISK. THE BEST TIME TO THREAT MODEL IS NOW!

Anonymous