Secure Your Logs Down to the root

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Barcelona | January 27-31, 2020

DEVLIT-4020

Agenda

- Introduction
- Quick Concept Review
- Log Management Life Cycle
- Security Implications Over the Cycle
- Best Practices Moving Forward
- Conclusion

Before I Get Started

There will be some text heavy slides 😱📚

There is a link to
my slides & resources
at the end.

Let’s Dive In

A Quick Overview of Terms & Concepts

Hash: Obscuring Data

(one directional)

Pinch of salt

Encrypt: Obscuring Data

(bi-directional)

Common Weakness Enumeration (CWE)

Common Vulnerabilities and Exposures (CVE)

Try to avoid bloating the term “security”

Different Security Objectives*

- Confidentiality
- Integrity
- Availability
- Authentication
- Authorization
- Non-repudiation

*Not an exhaustive list

Always be aware of your objective(s).

Oh, and what do I not mean by security?

Security through obscurity

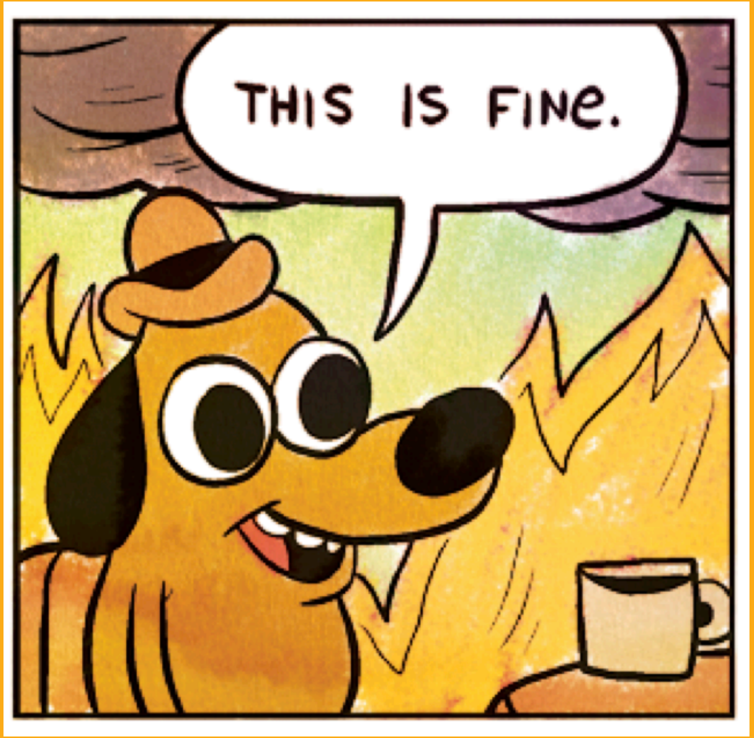
No.

Do not do this.

Because (unintended) consequences

e.g. "They don't know where ${X} is, right?"

(Who needs consistent naming conventions anyway?)


THIS IS FINE.

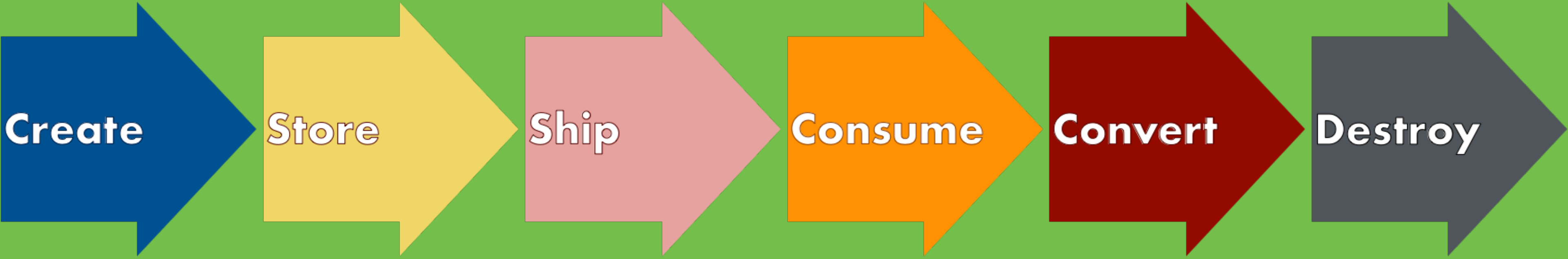
e.g. "Key management is hard, let's share."

(This isn't your housemate.)

I'M OKAY WITH THE EVENTS THAT ARE UNFOLDING CURRENTLY.

There are more, but I think you got it.

The main event: how does this apply to logs?



Create

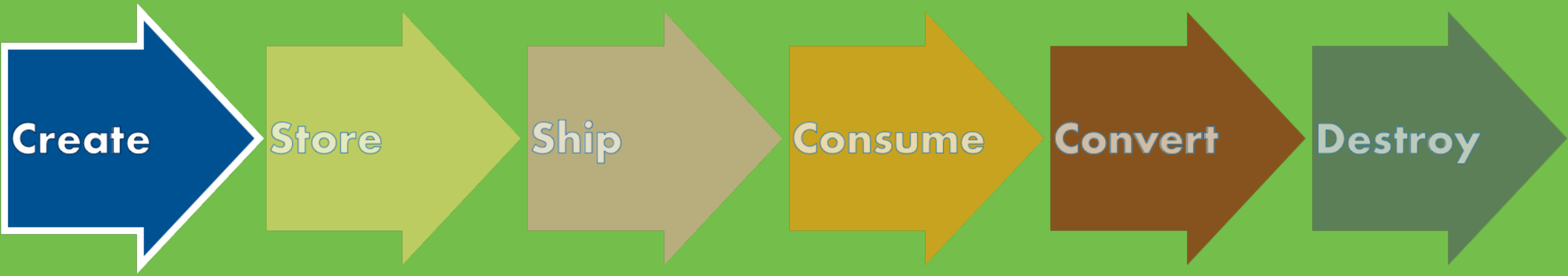
Store

Ship

Consume

Convert

Destroy



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Do not write sensitive data to your logs

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What is sensitive data?

Some Examples of Sensitive Data*

- Personally identifying information (PII)
  - Tax and passport IDs are high cardinality, right? 😂
- Credentials, including passwords and keys
  - e.g. ever version control your dotfiles?
- Keystrokes
- Matching results by either percent (e.g. X% match on FaceID or fingerprint) or pass/fail
- Financial or health data
- Internal endpoints and/or IP addresses
- Database queries

*Not an exhaustive list

Essentially, log only what you need.

"What if I really need that sensitive data", you ask?

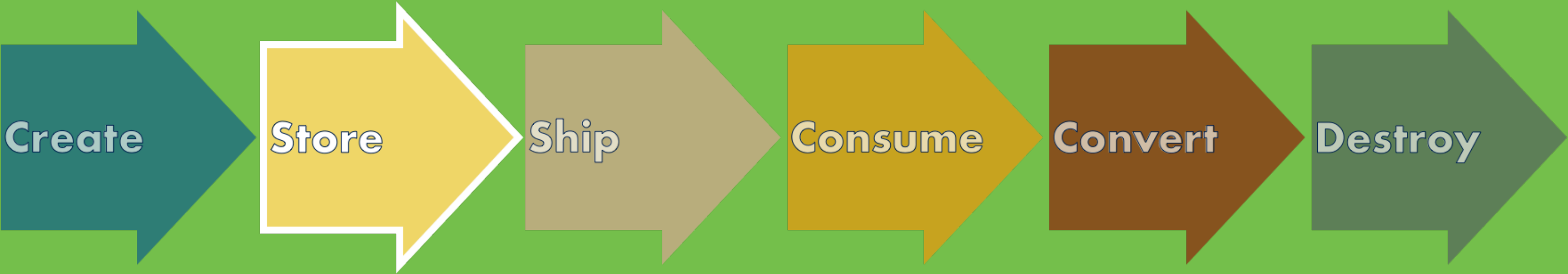
Food for thought, this is CWE-532*.

So it comes up.

Don't ship it - log around it, e.g.:

- Use a token that references the data
- Use a salted or low-sodium hash
- Encrypt the log and/or your data
- Redact data as needed
- Remember to adhere to any regulatory compliance requirements
  - e.g. GDPR, CCPA, PCI, HIPAA

Now what to do with these logs?



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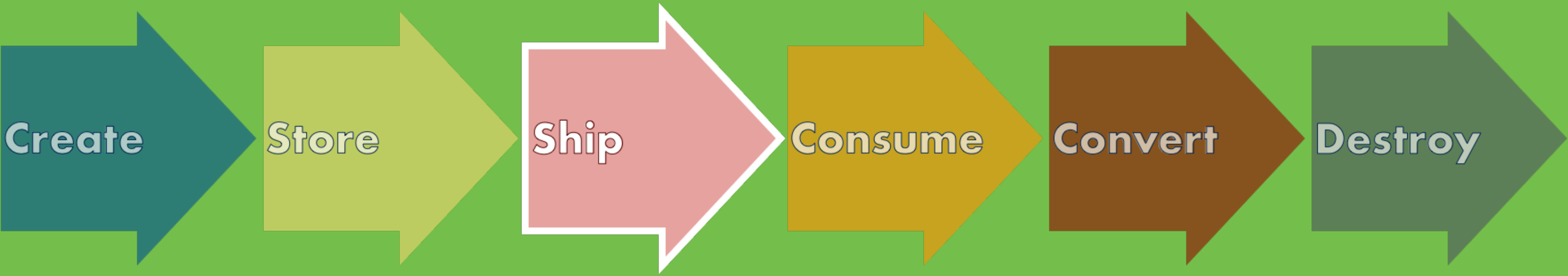
Batten Down the Hatches

- Limit access to the log files
- Limit access to the storage volume(s) they reside on
- Log files should be append only
- Encrypt where possible
- Take a look at forward secure sealing (FSS) if you're encrypting your logs
  - i.e. how to prevent past manipulation with current keys
- Rotate your log files regularly



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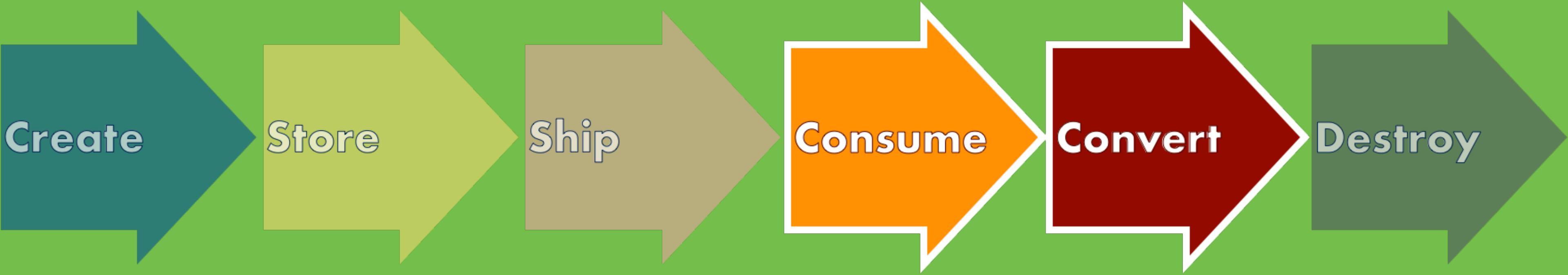
Actually Shipping It This Time

- If you are using a 3rd party / SaaS solution:
  - Make sure your provider supports shippers that allow you to ship securely, e.g. over TLS / SSL via rsyslog.
- If using an on prem solution:
  - Secure your network
  - Ship encrypted
  - Limit key access to central log server



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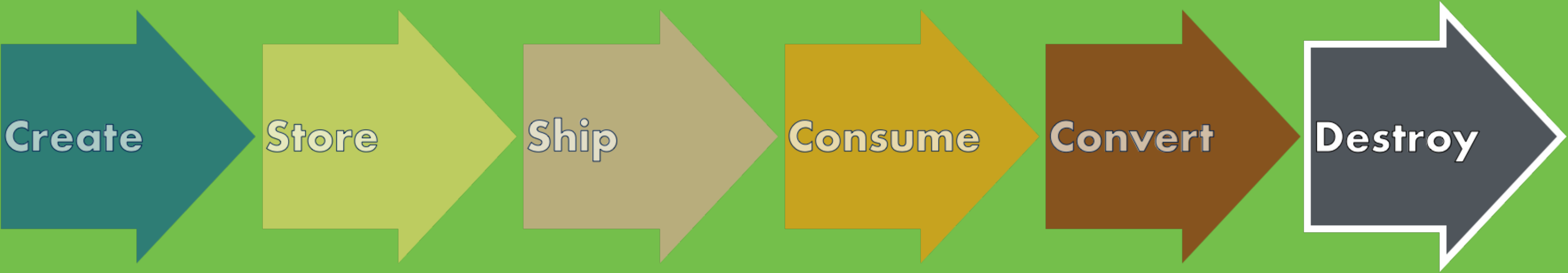
Safe Data Use

- For a SaaS solution: ensure they provide access control
- For an on prem solution: ensure you have access control
  - Also: limit access to the log server itself
- Limit / deny malformed or malicious queries
  - e.g. Elastic has a handy 2014 blog post (back in its youth) that explains a few ways to crash the then-current version of Elasticsearch (to help you start thinking about this topic).



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Secure Destruction

- This also comes up often (CWE-117)
- Ensure that locally and remotely (if using a SaaS) that data is destroyed according to relevant industry standards / procedures
  - e.g. CESG CPA, NIST, Cryptographic Erase
  - This may mean anything from wiping data to shredding physical storage, depending on your industry.
- Do you need to delete or wipe? Know the difference. Use the difference.

Closing Tips

Tip # 1: Know your data

Tip # 2: Know your infrastructure

Tip # 3: Know your risks

Tip # 4: Don't apply what doesn't apply

Tip # 5: Trust, but verify

Tip # 6: Use your metrics

Tip # 7: Protect & utilize your audit trail

Tip # 8: Use well designed alerts judiciously

Tip # 9: Don't be a target - find help as needed

Tip # 10: Prevention is the difference between This Is a Problem and This Is a Disaster.

Before you go...

- Security is a broad space with a lot of separate concepts
  - e.g. Authorization, Integrity, Availability, etc.
- Don’t store sensitive data …
  - … but if you do, make sure it’s obscured, e.g. via token, hash, or encryption.
- Know your data and your infrastructure: you need to know what tradeoffs you are making to address them later.

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- *Know your data and your infrastructure: you need to know what tradeoffs you are making to address them later.*
- For more questions: please join the WebEx room DEVLIT-4020
- Help me iterate – complete the survey and tell me your thoughts!

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References & Reading Available on Notist

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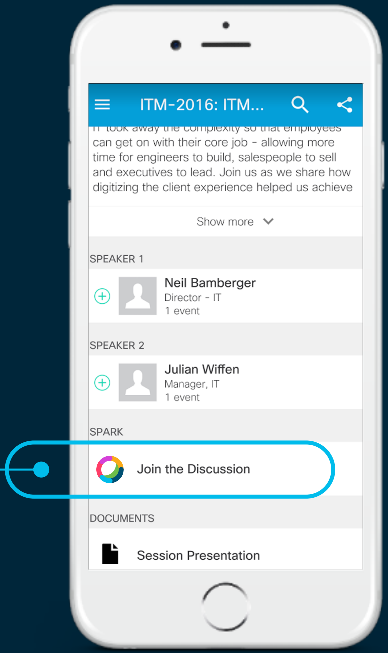

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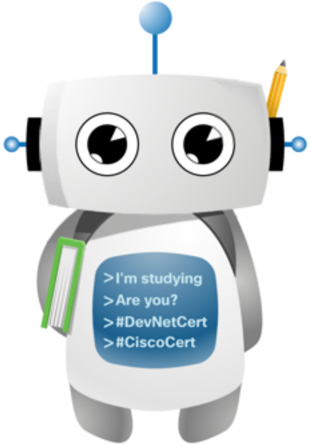

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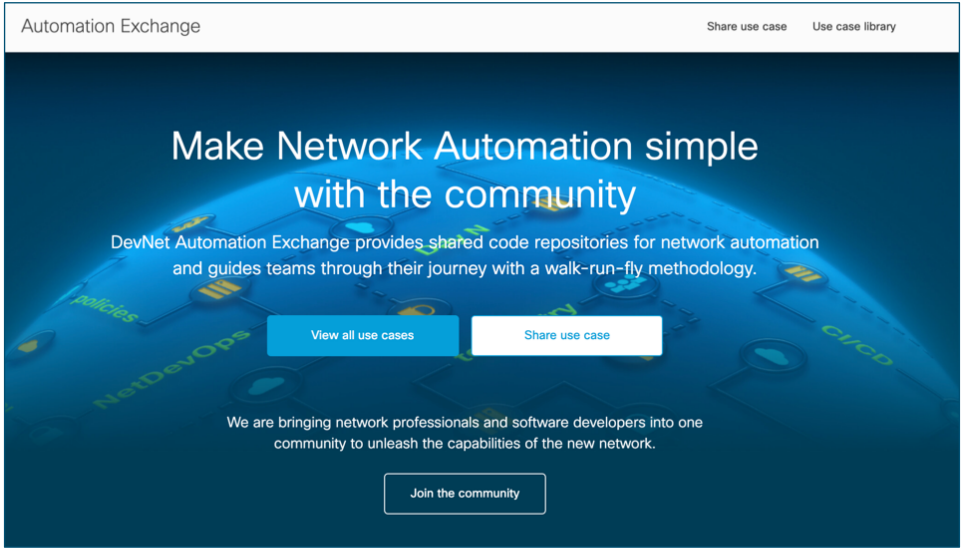

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