Threat Prioritization: Freeing the White Whale

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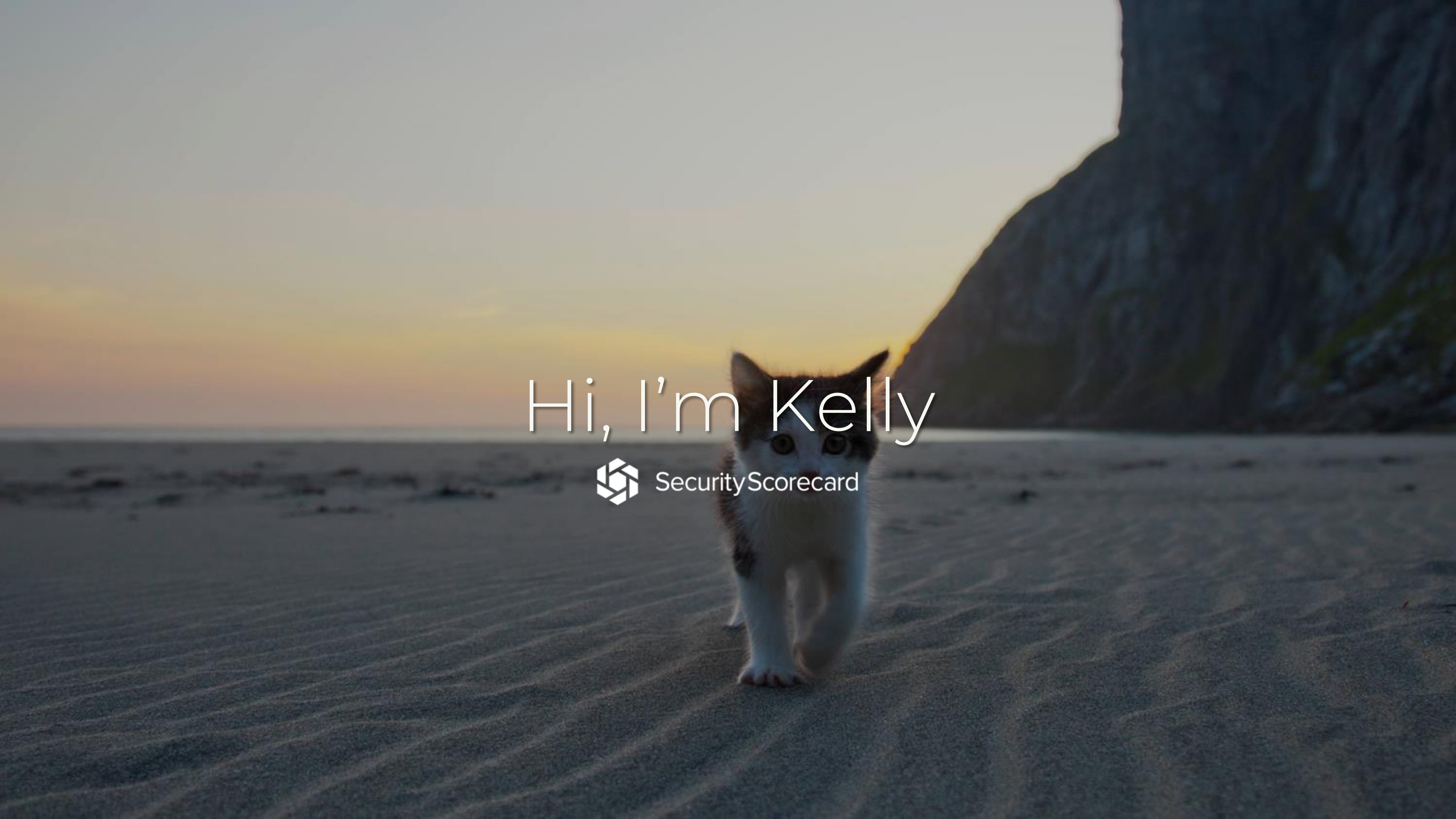
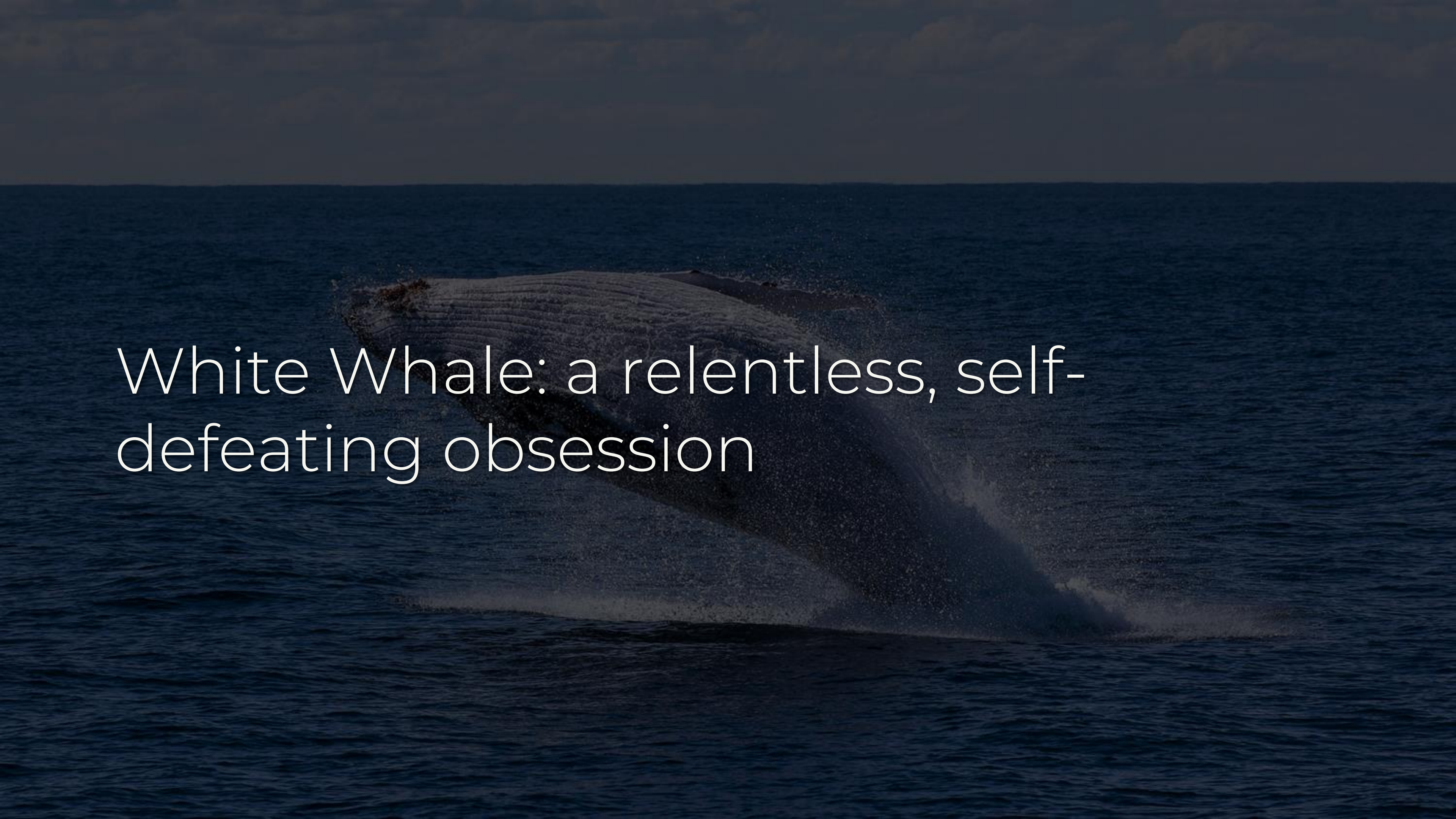
HackNYC 2018



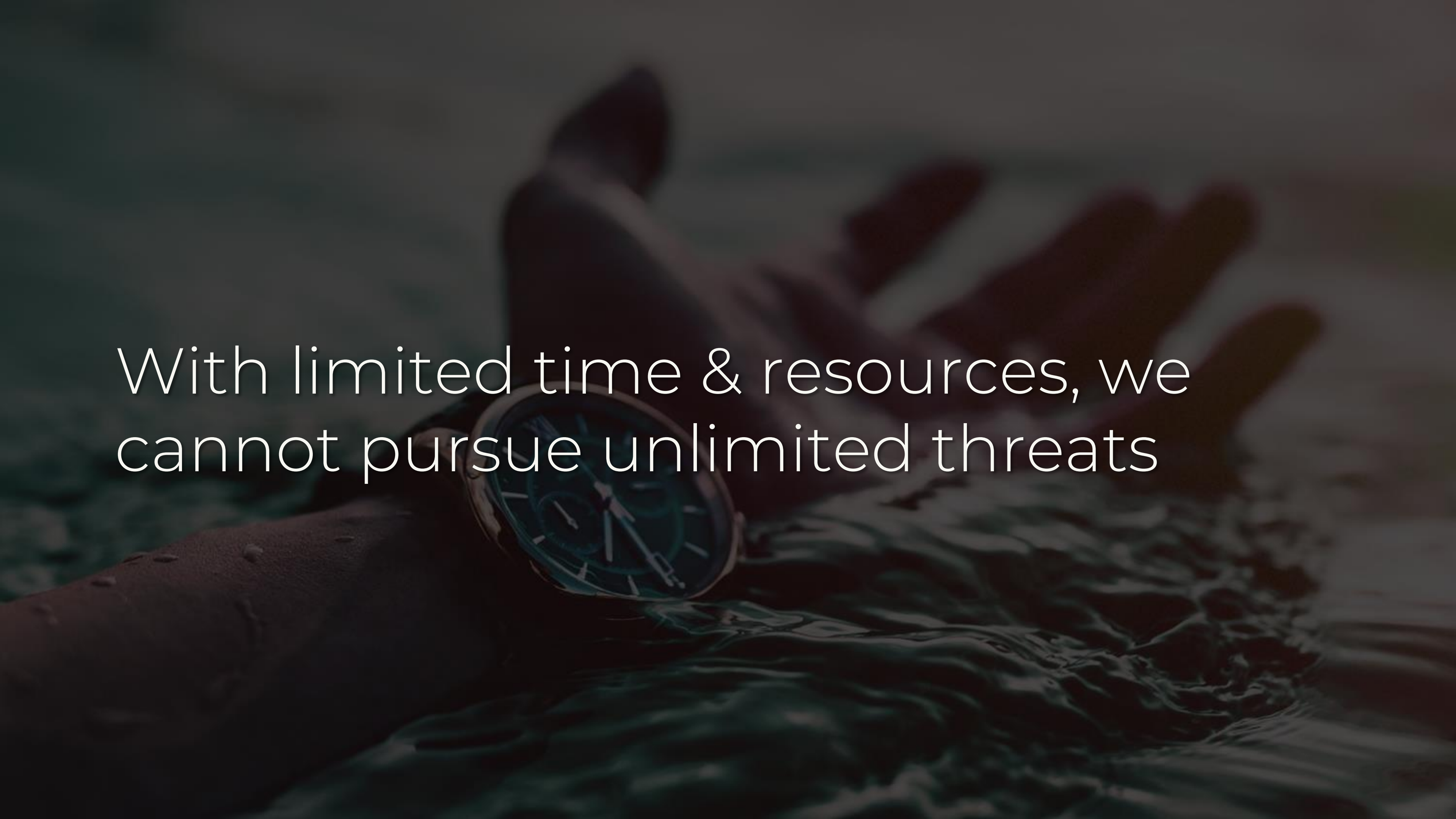
Hi, I’m Kelly

SecurityScorecard

> “All my means are sane, my motive and my object mad.”
>
> — Herman Melville, *Moby Dick*



White Whale: a relentless, self-defeating obsession



With limited time & resources, we cannot pursue unlimited threats

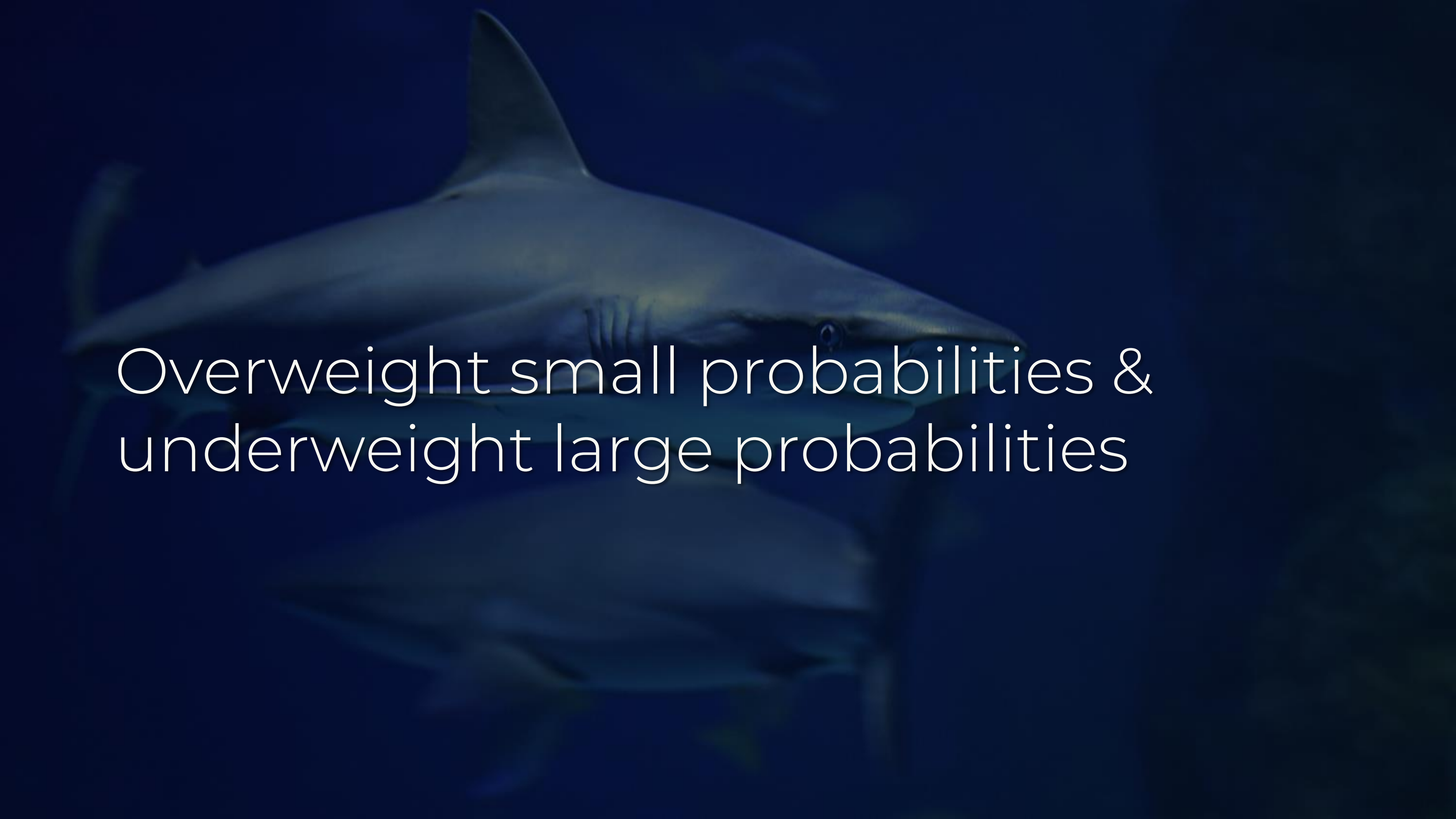
Hunting the White Whale will leave you vulnerable – or even destroy you

1. Cognitive Biases
2. Prioritization Framework
3. Industry Examples

Cognitive Biases

Cognitive biases: we use subjective perceptions of inputs for decisions

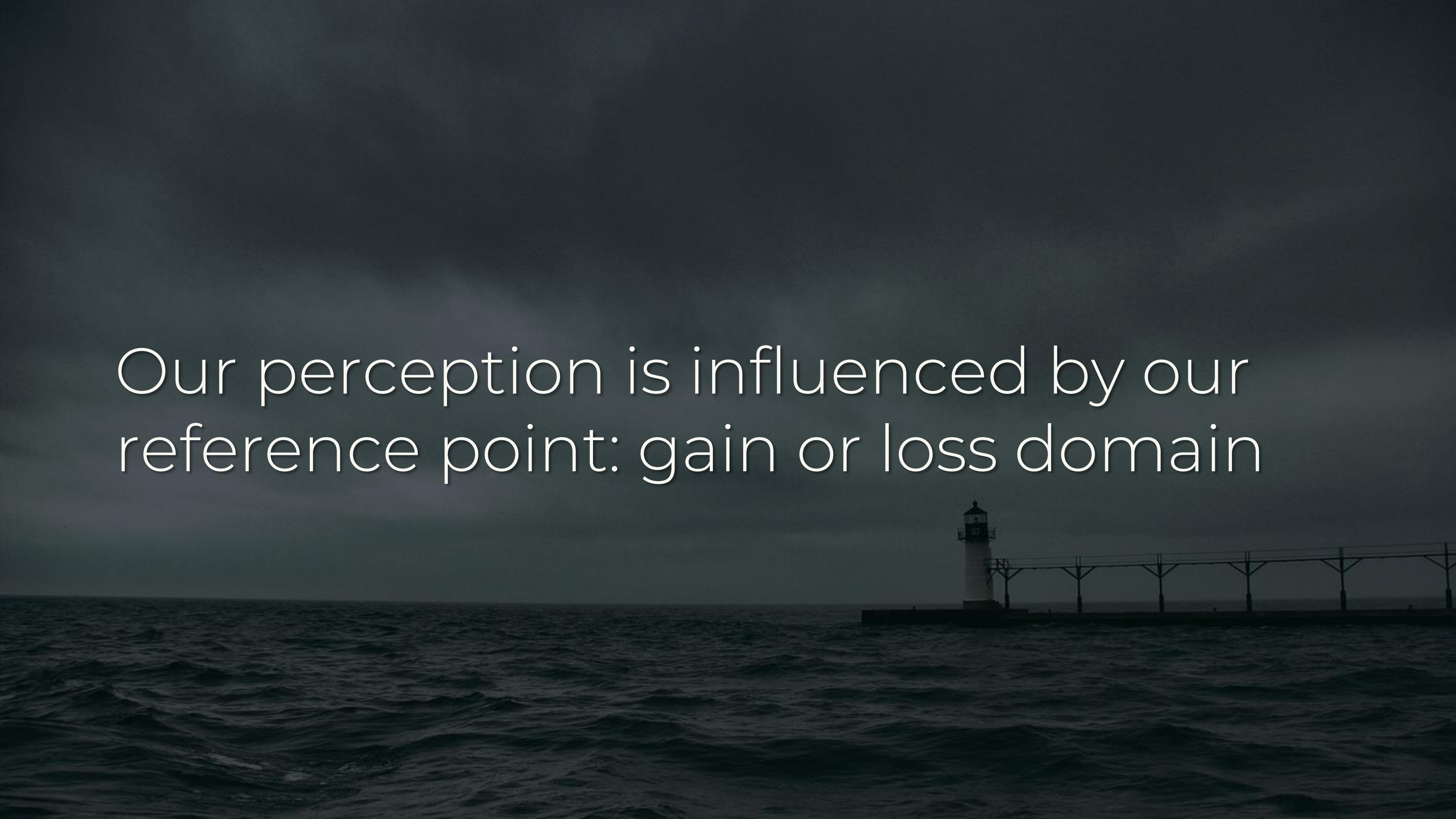
Heuristics – mental short cuts that allow us to make faster decisions



Overweight small probabilities & underweight large probabilities

Specifically, ~35% likelihood is when we begin underweighting events

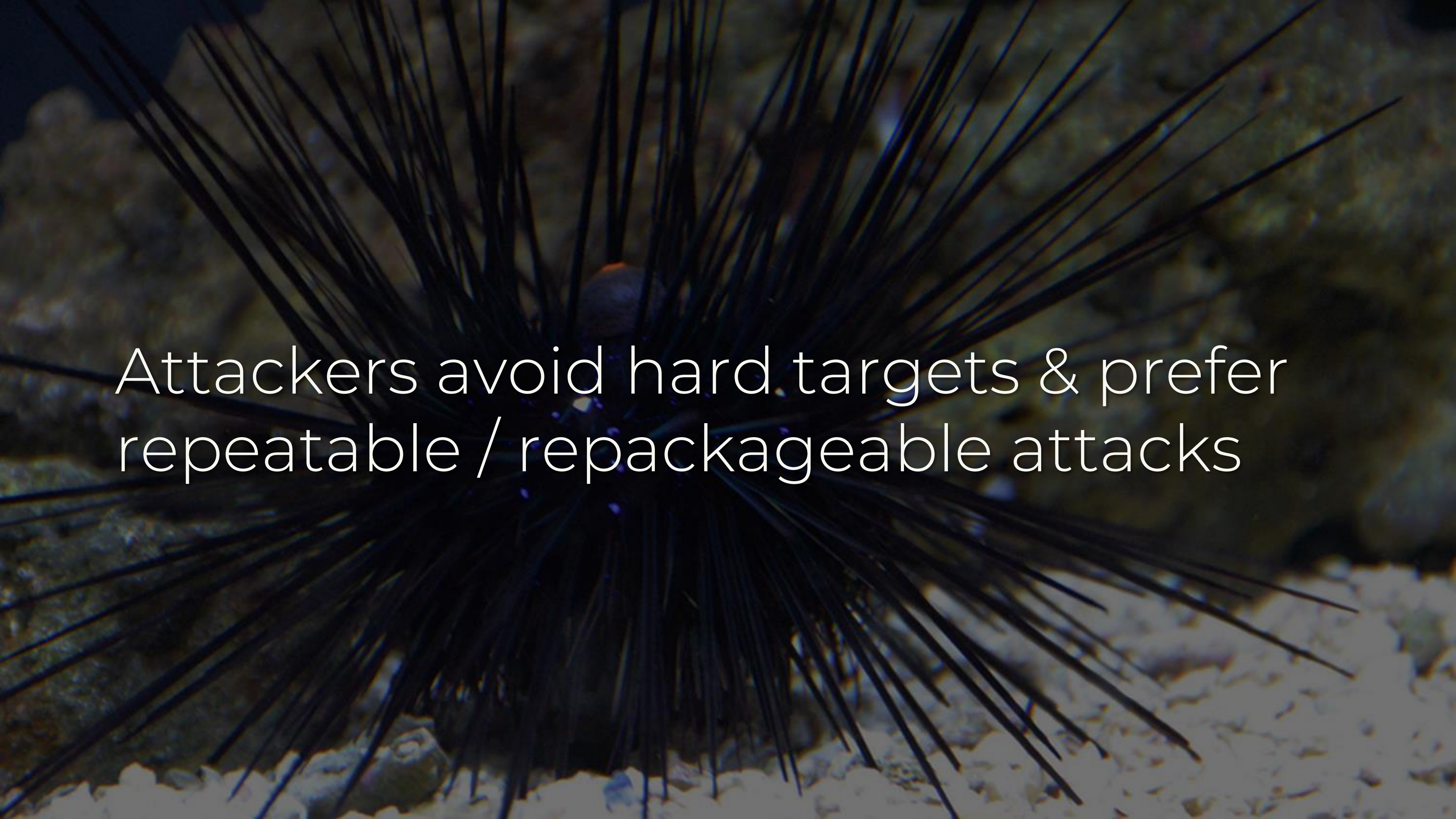
Super elite 0day (overweighted) vs. phishing (underweighted)



Our perception is influenced by our reference point: gain or loss domain

Attackers are risk-averse

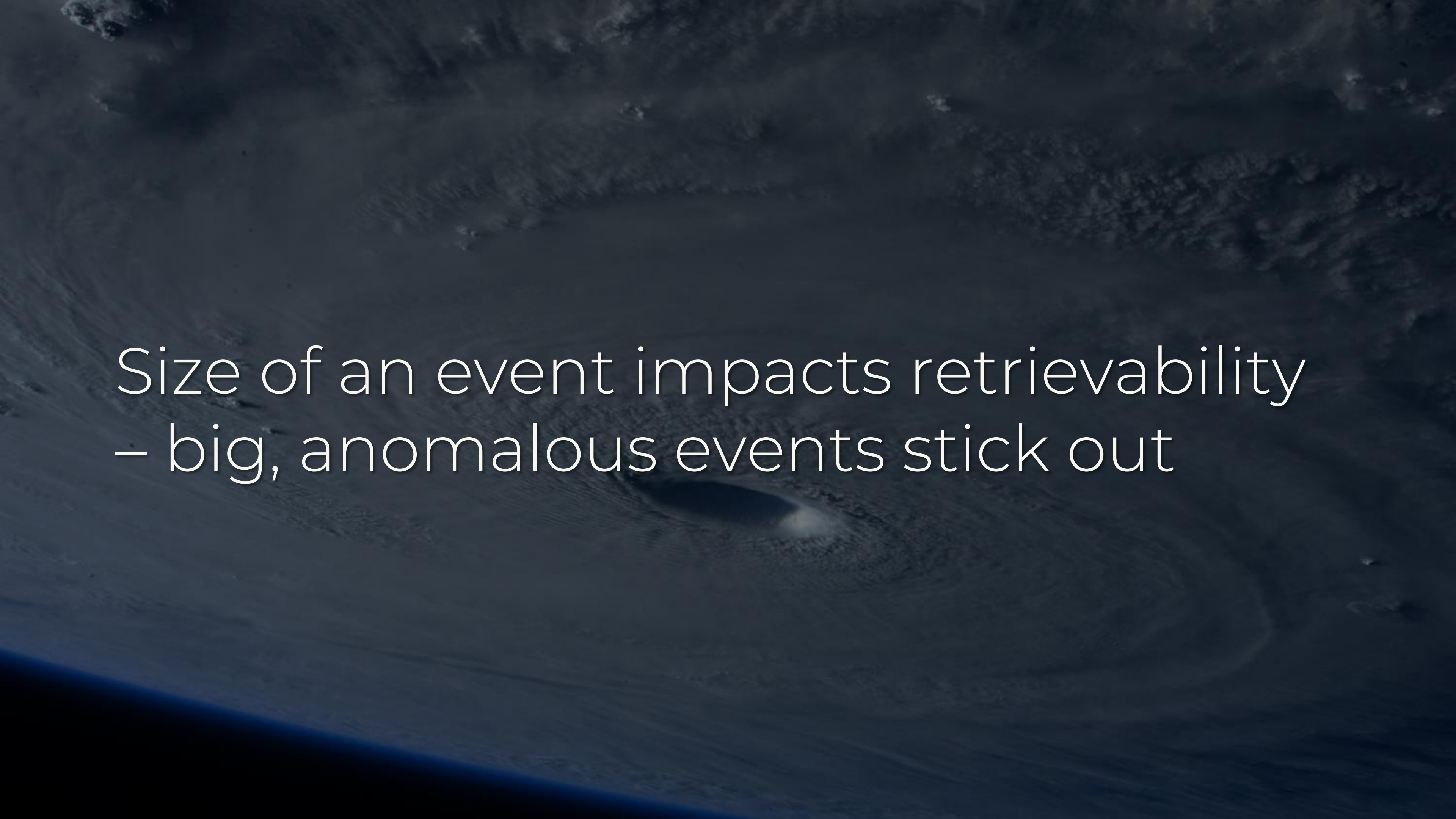
Defenders are risk-seeking



Attackers avoid hard targets & prefer repeatable / repackageable attacks

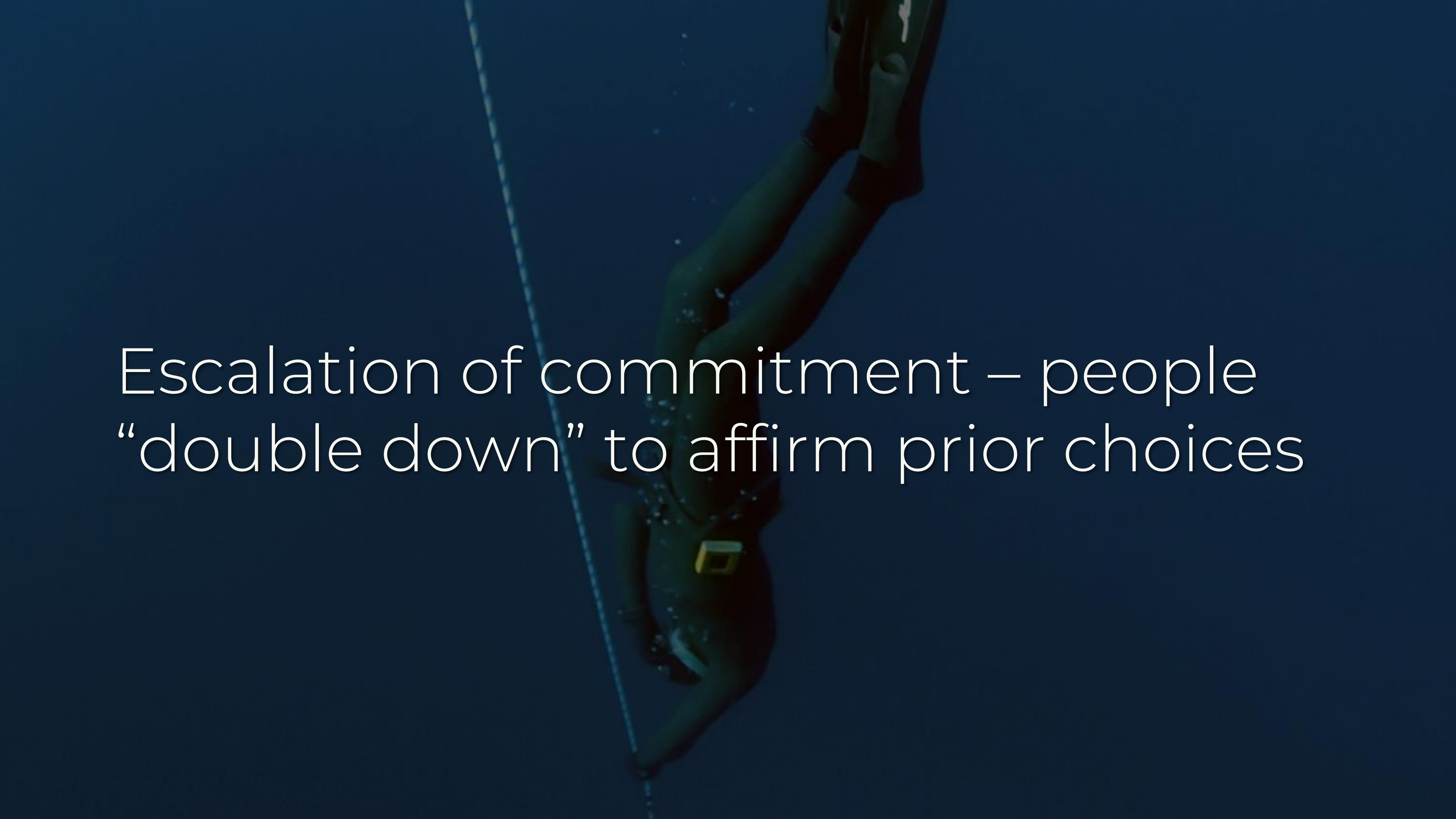
Defenders prefer a slim chance of a “gain” (stopping a hard attack)

Availability heuristic – those headlines about “Cybergeddon” influence you



Size of an event impacts retrievability – big, anomalous events stick out

Your executives will be prone to this – come prepared with actual data



Escalation of commitment – people “double down” to affirm prior choices

Continuing to use strategies or vendors with limited efficacy or ROSI

Confirmation bias: people try to prove hypotheses vs. disprove (less efficient)

Finding one incident that proves a threat exists & ignoring improbability

How can we counter these biases & adopt a framework based on realism?

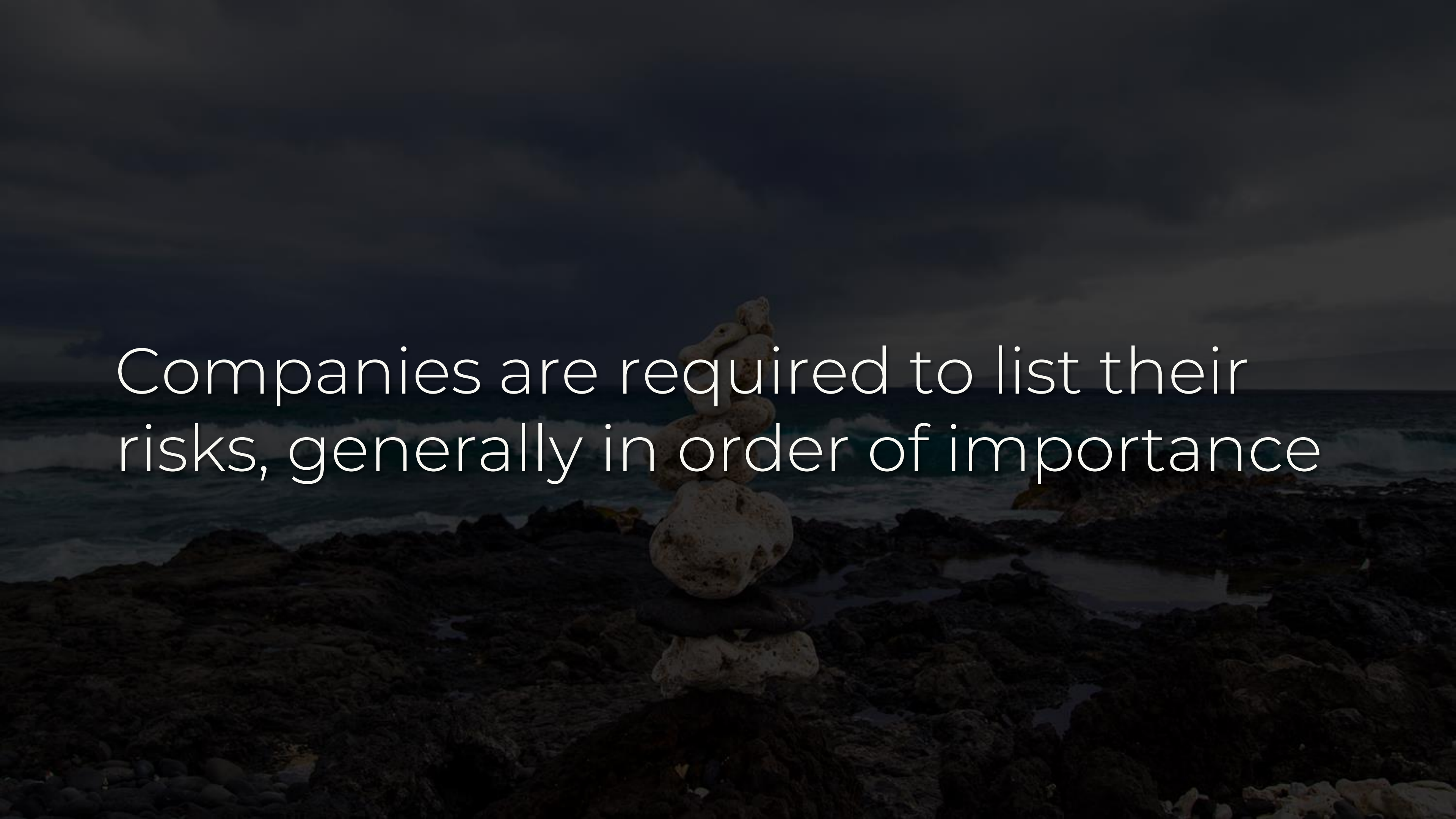
Prioritization Framework

What hurts your business compared to what is valuable to attackers?

Step 1: How does your business make money? What are risks to that?

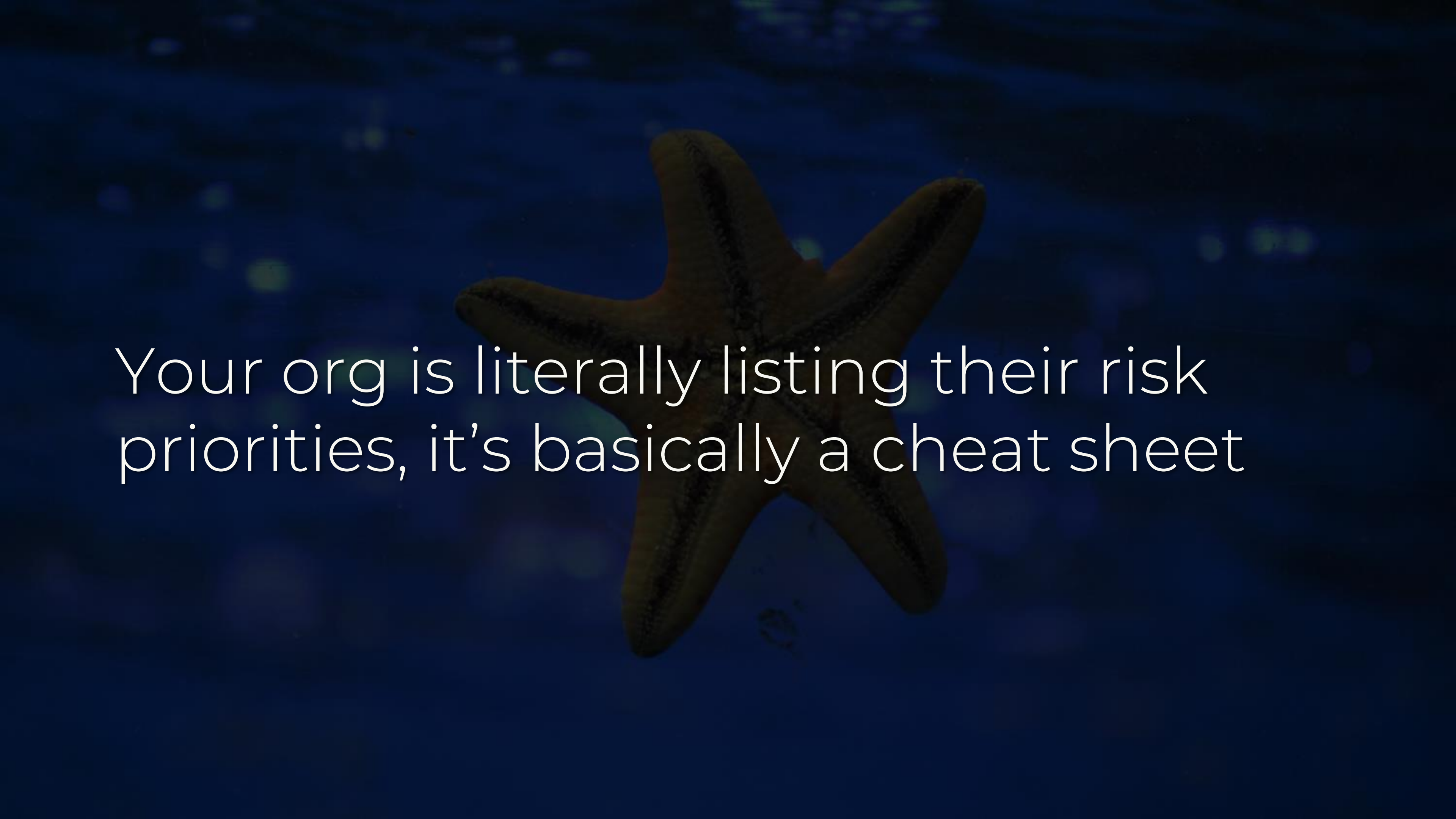
Go to your org’s / your competitors’ Investor Relations website

10-K is an annual report about a business’ operations required by SEC



Companies are required to list their risks, generally in order of importance

Read the “Risk Factors” section of your company’s (or competitors’) 10-K



Your org is literally listing their risk priorities, it’s basically a cheat sheet

Reality check: “cyber risk” is usually in the last third of the list

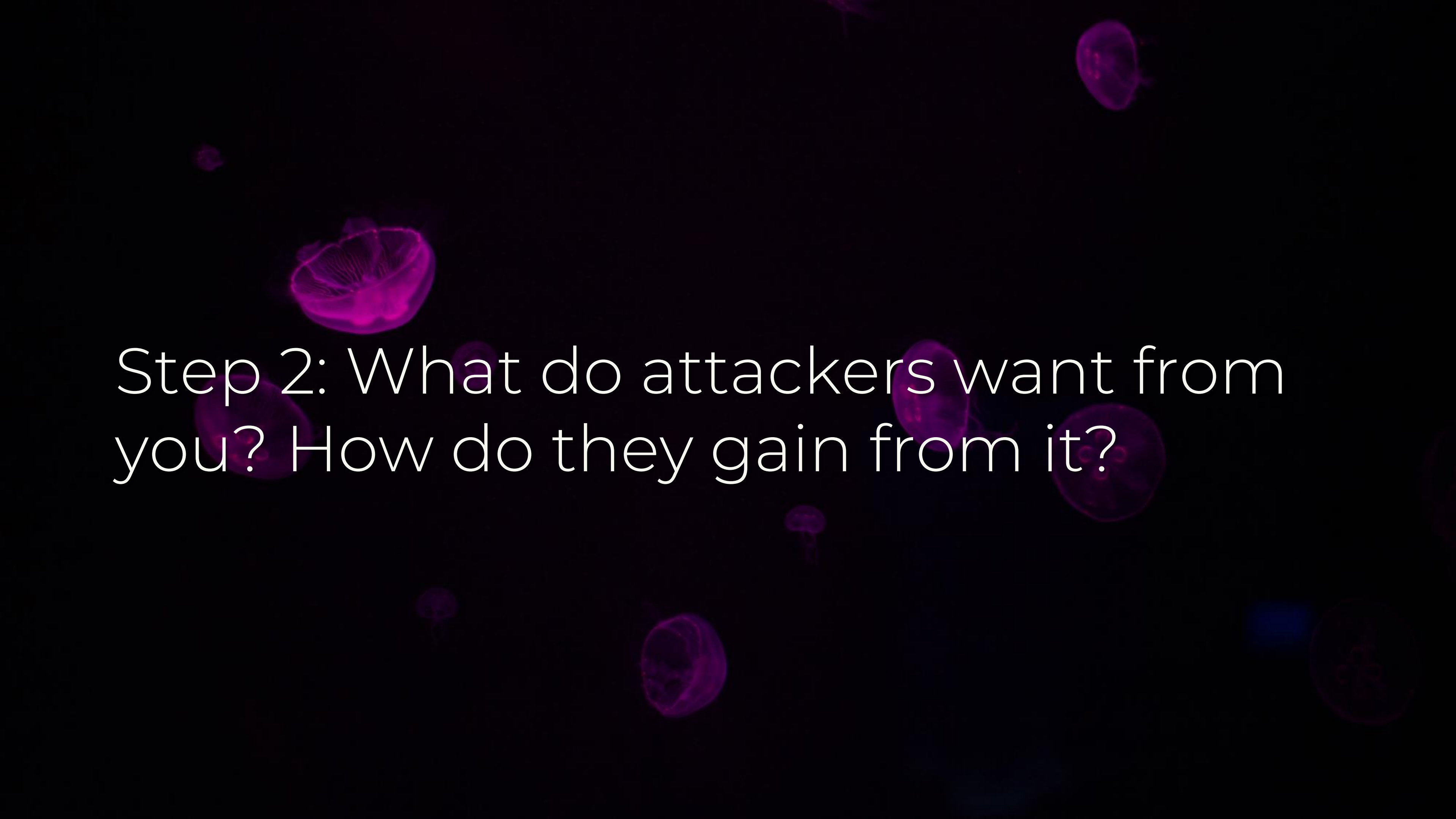
Which business lines make the most money for your company? (Item 6)

The consumer-facing segment isn't always the most revenue-generating

IR resources: cheat-sheets for future priorities, so you can plan ahead

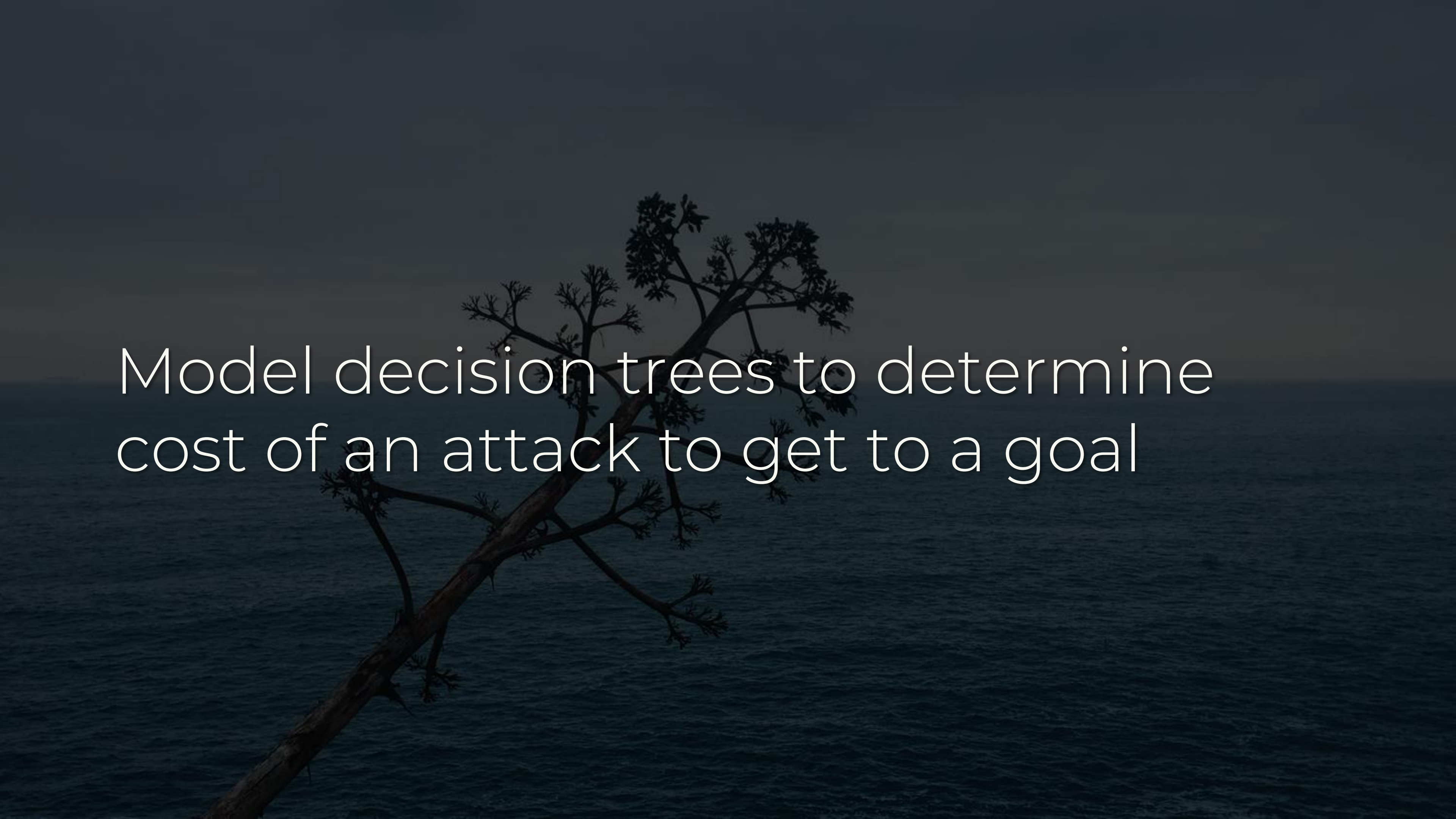
Read cyber insurance coverage for your industry, including exceptions

Ask your local finance / accounting colleague what they think



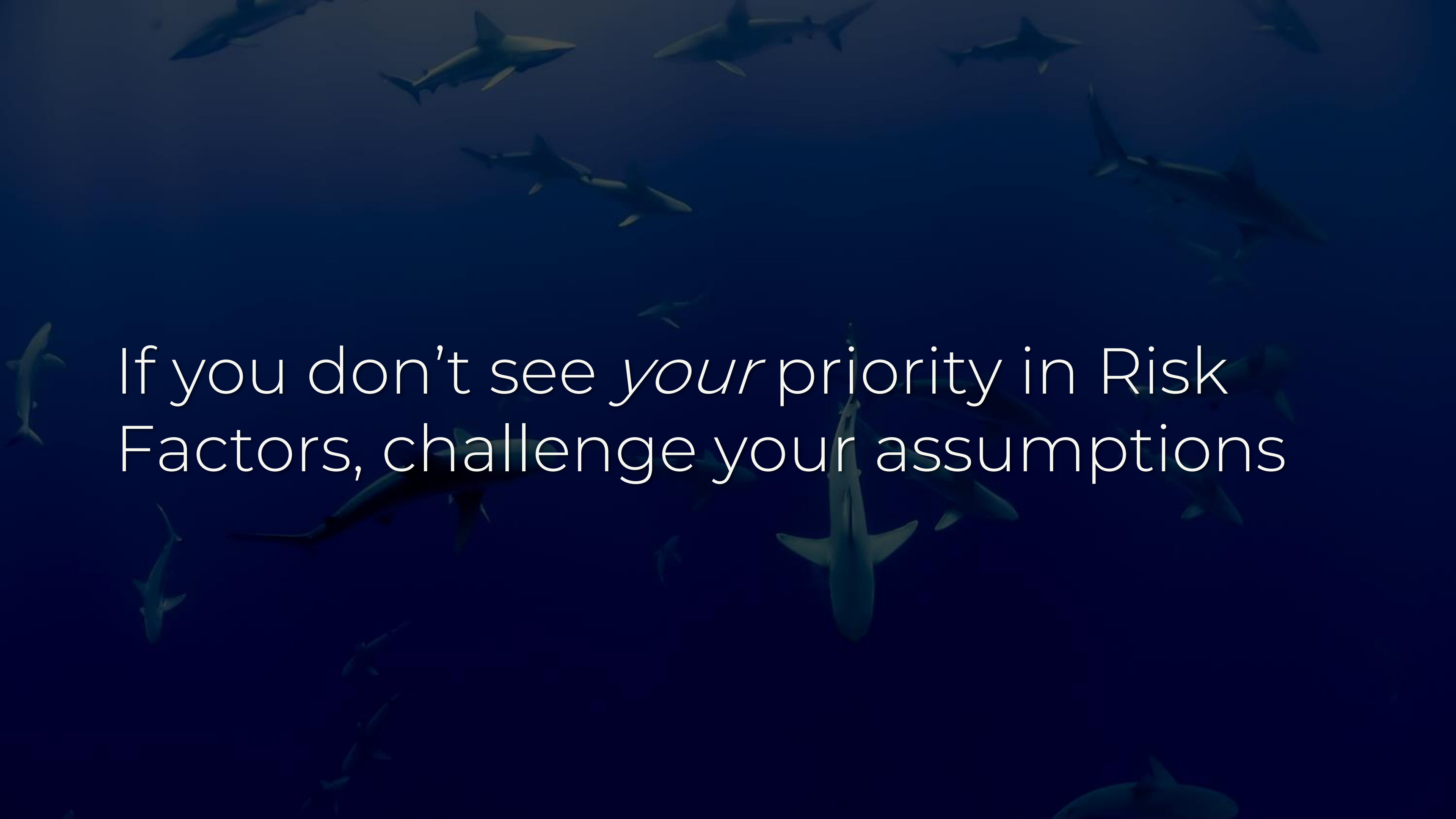
Step 2: What do attackers want from you? How do they gain from it?

Criminals need monetization & deeply care about ROI



Model decision trees to determine cost of an attack to get to a goal

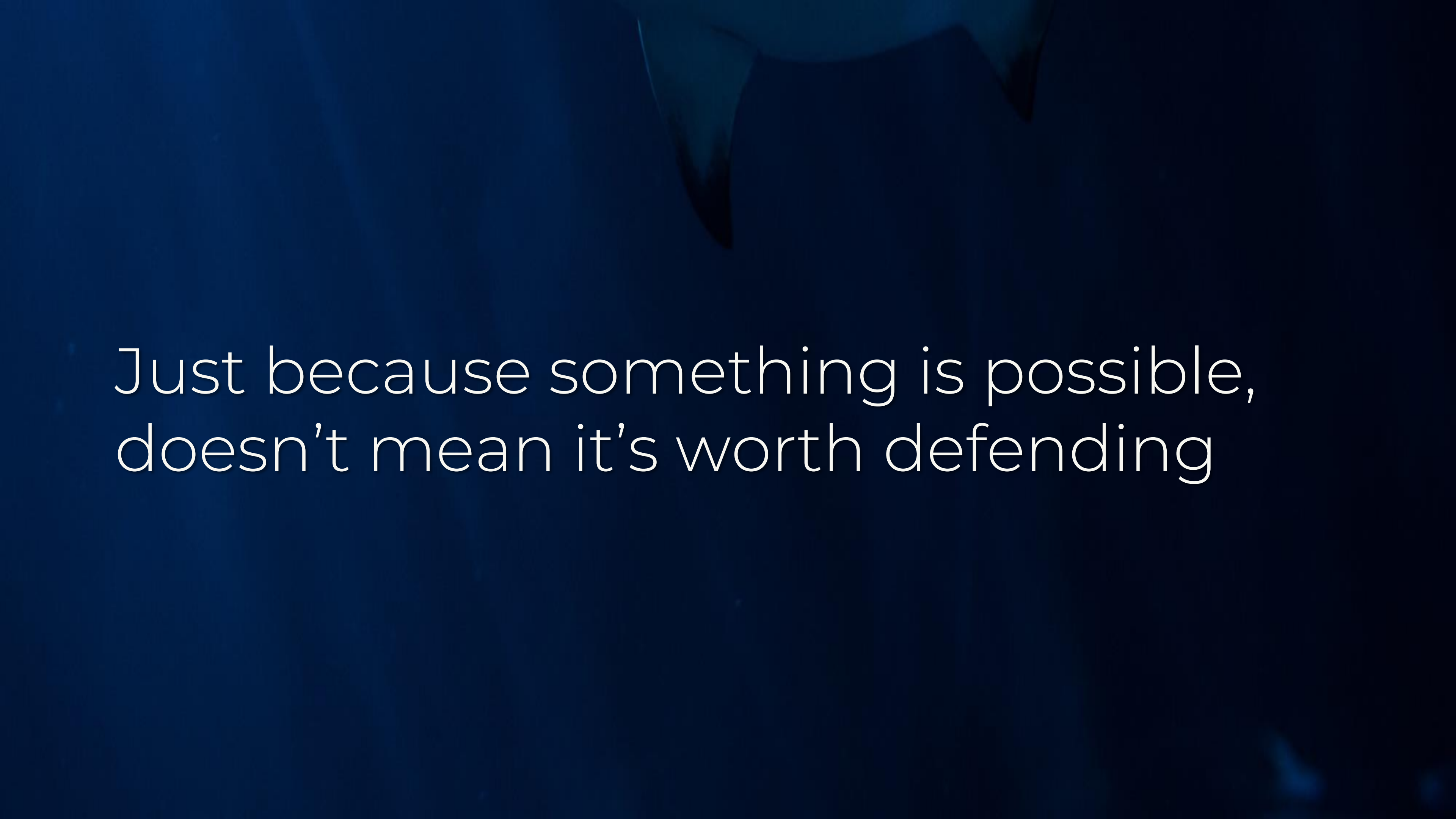
Step 3: Cross-compare results



If you don’t see *your* priority in Risk Factors, challenge your assumptions

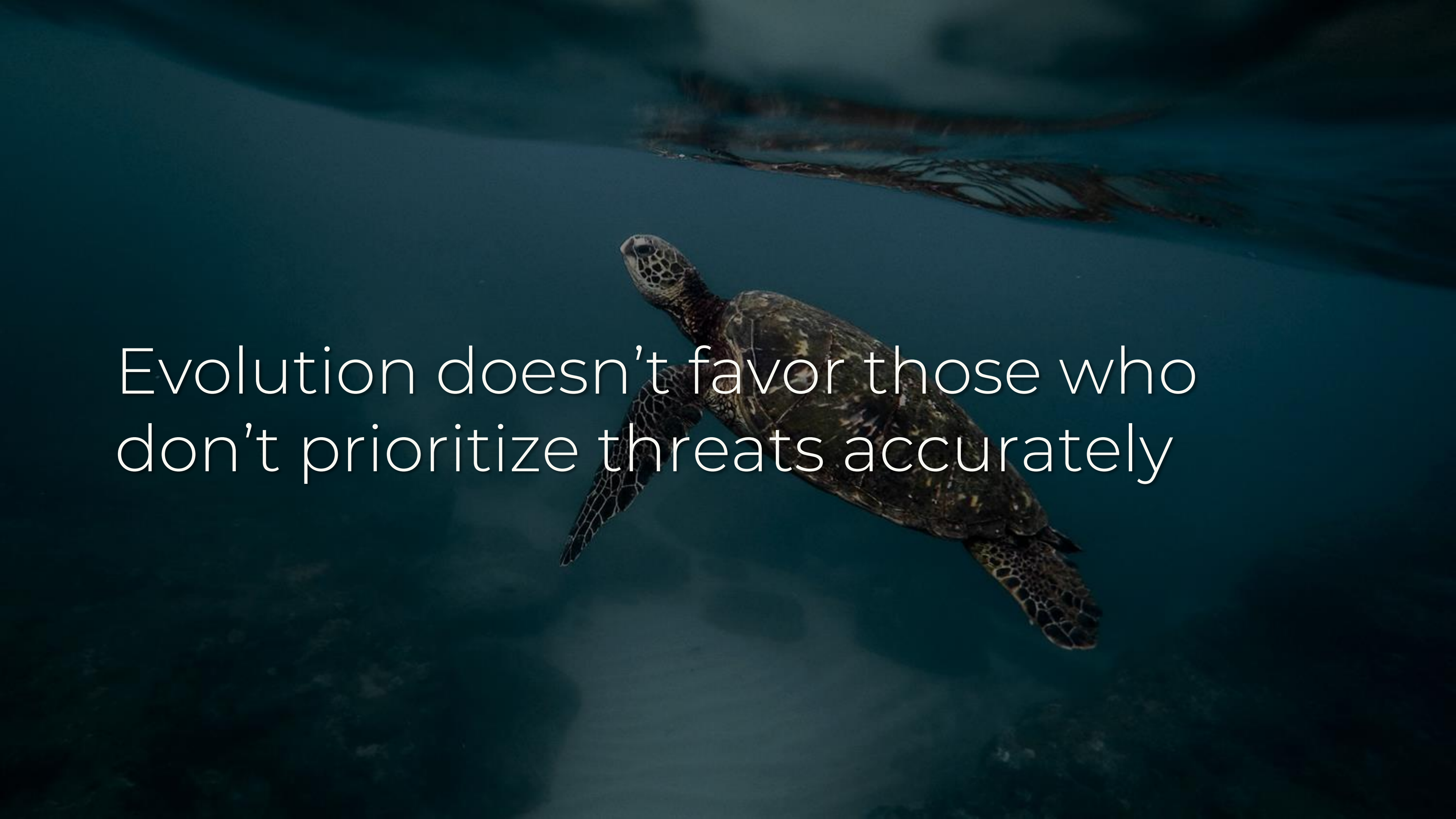
If there’s a Risk Factor that is implausible for attackers, let it go

Hackers are unlikely to remotely crash your satellite into space debris

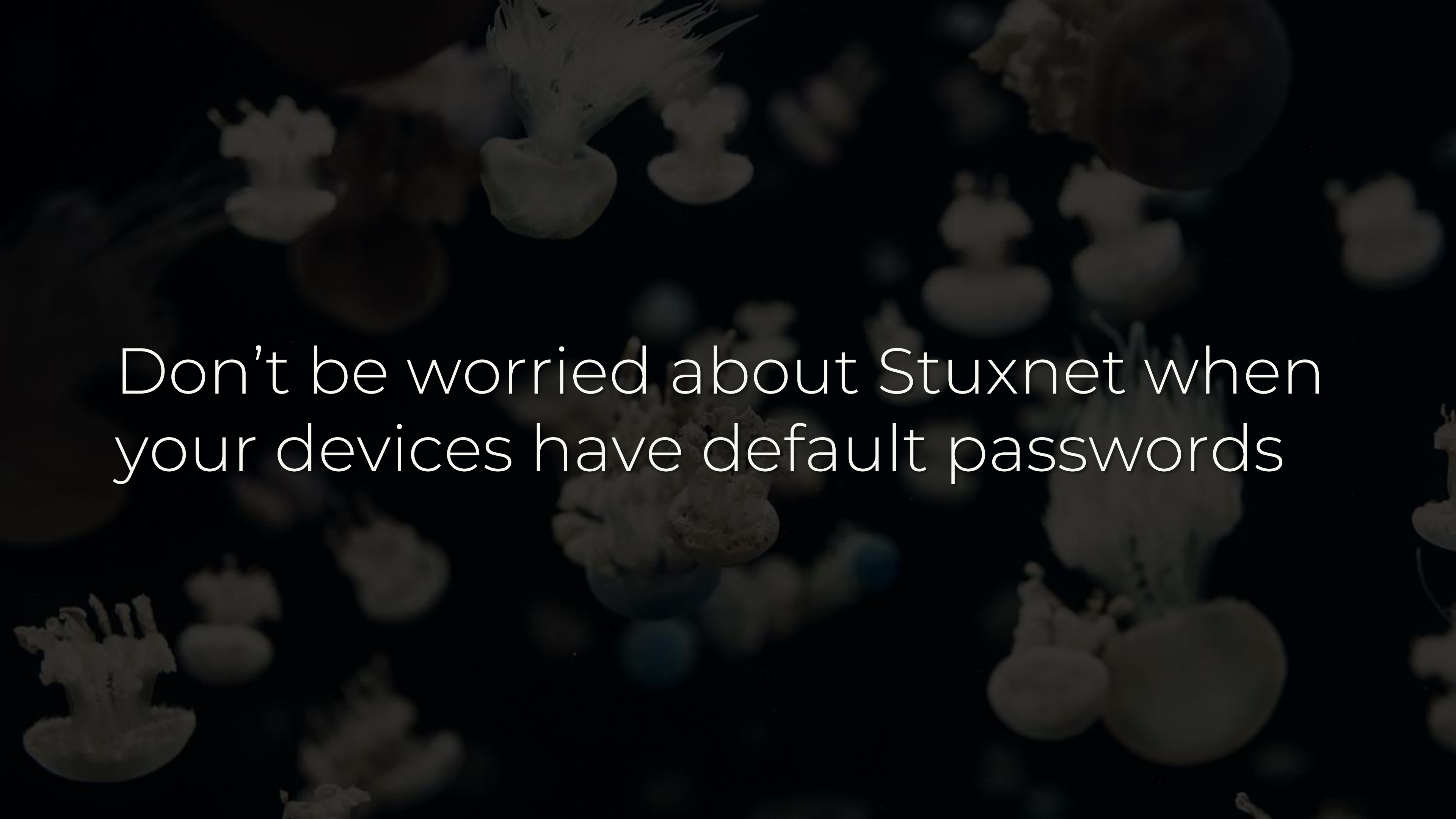


Just because something is possible, doesn’t mean it’s worth defending

Security morals: literally every threat is the most super duper critical ever

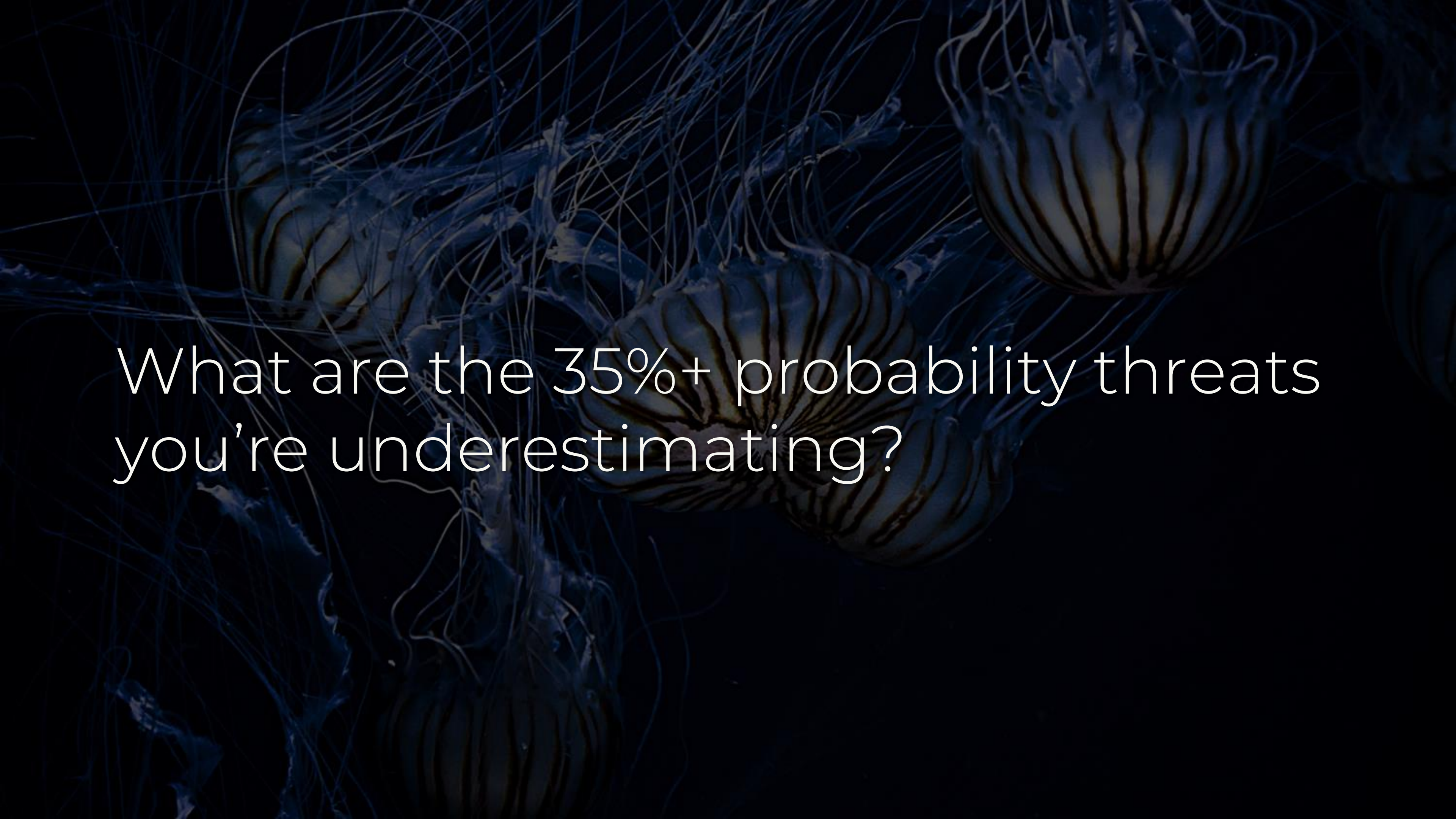


Evolution doesn’t favor those who don’t prioritize threats accurately



Don’t be worried about Stuxnet when your devices have default passwords

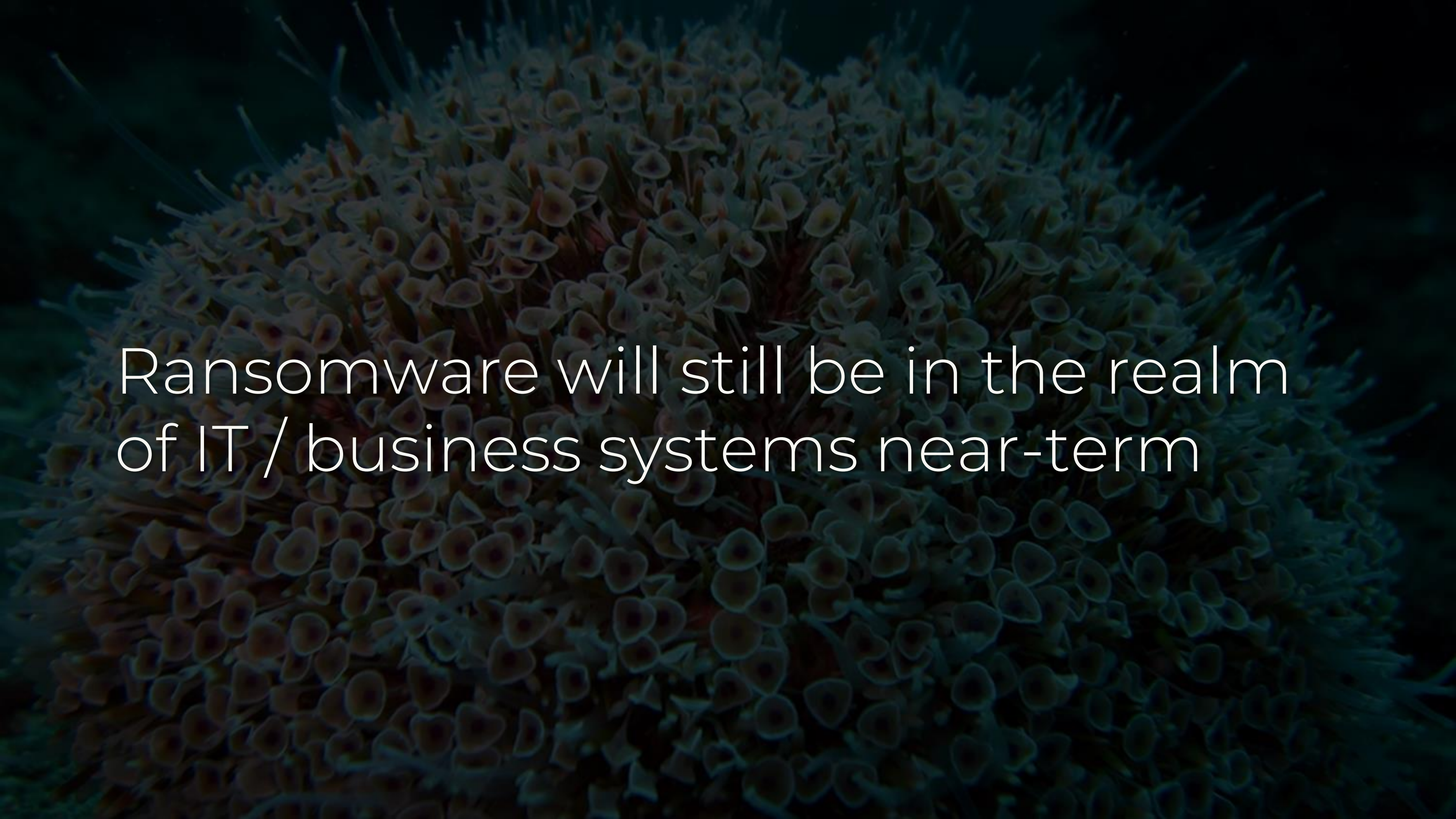
Financial impact analysis is an essential part of your risk assessments



What are the 35%+ probability threats you’re underestimating?

Spear-phishing & BEC – attackers might as well try it first

DDoS attacks – spam or ransom



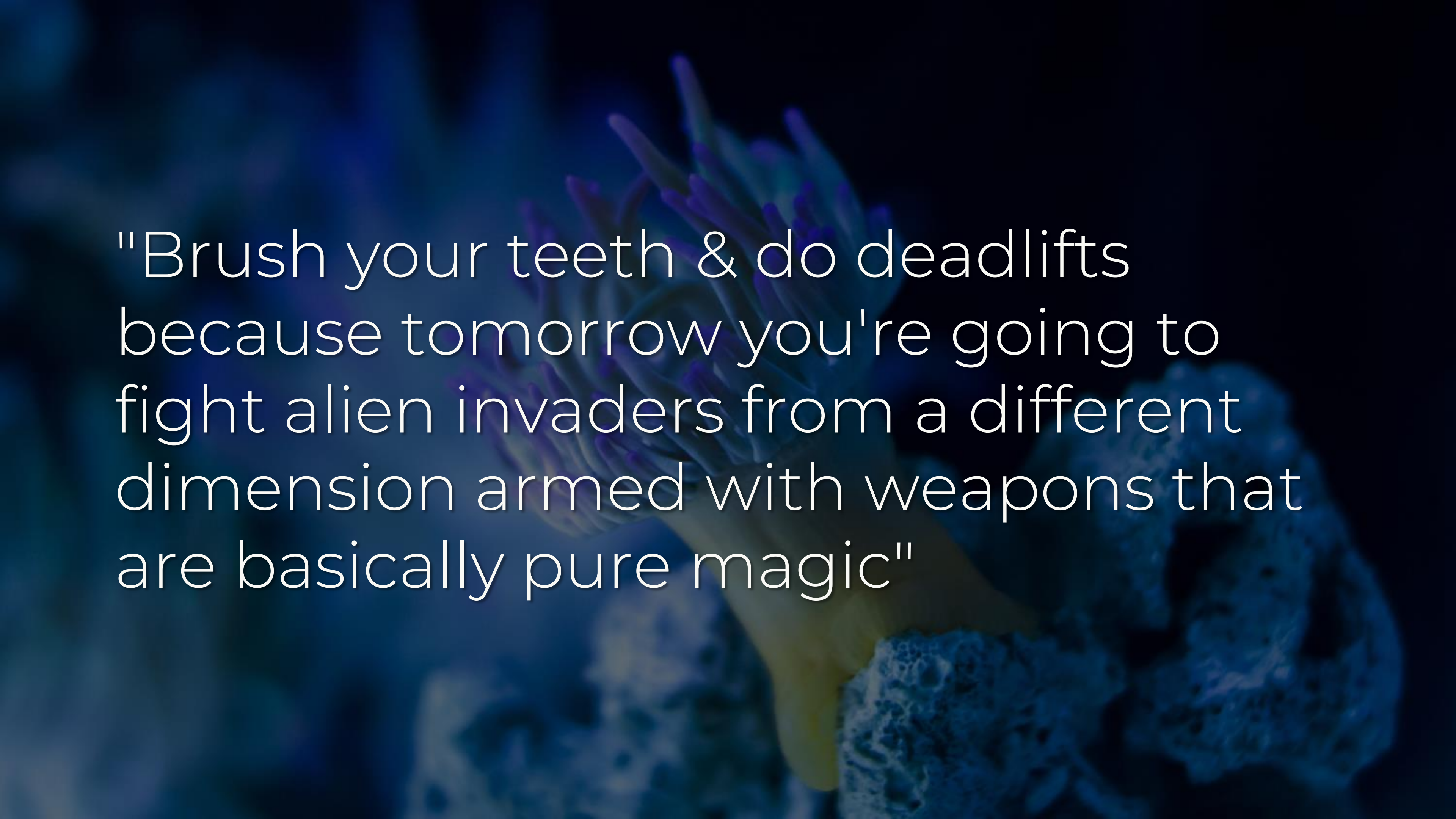
Ransomware will still be in the realm of IT / business systems near-term

Time & resources required to port ransomware to OT = poor ROI

Mid-level attacks for OT simply don’t have proper economics for attackers

Well-resourced groups, sophisticated techniques – please try to care less

CNI threat model: IT systems security basics + serenity prayer for APT



"Brush your teeth & do deadlifts because tomorrow you're going to fight alien invaders from a different dimension armed with weapons that are basically pure magic"

First $1mm in budget: backups, 2FA, SSO, config management, cloud SIEM

How would this apply to individual industries?

Energy

Step 1: What are the risks & predominant revenue sources?

Non-tech: changes in oil prices, regulations, cleanup liability, weather

Operational efficiency is seen as a competitive advantage now

Project management: negotiations, development, optimization

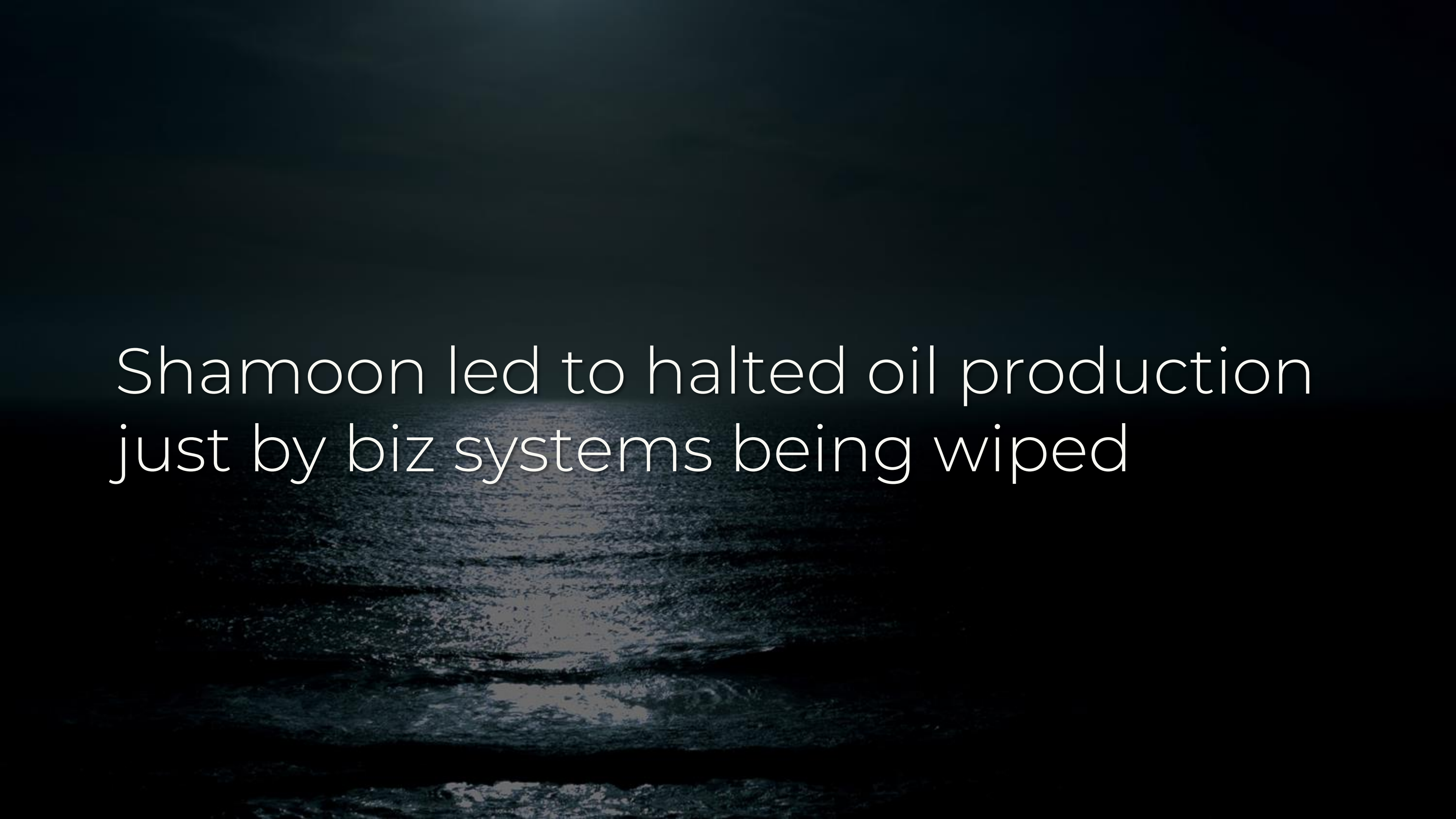
Tech: operational unavailability, inefficiency, or disruption

Infosec: physical harm, asset damage, op disruption, biz system compromise

Oil rig = >$500mm

Refinery = $5bn - $15bn

Disruption of operations: more about the business side, ie IT systems



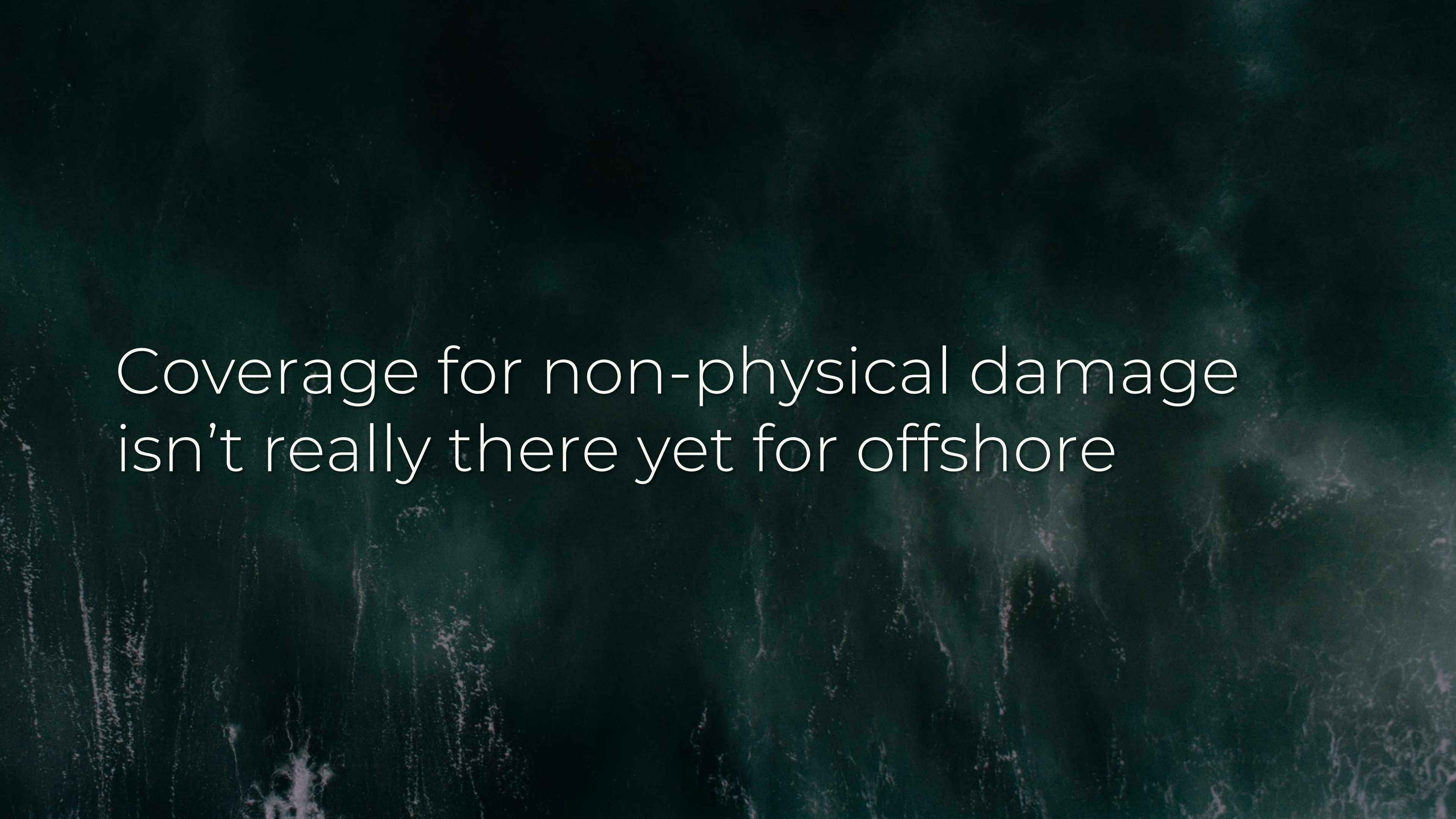
Shamoon led to halted oil production just by biz systems being wiped

Up next: using big data for predictive maintenance = more connected

What is being insured by cyber insurance for oil & gas?

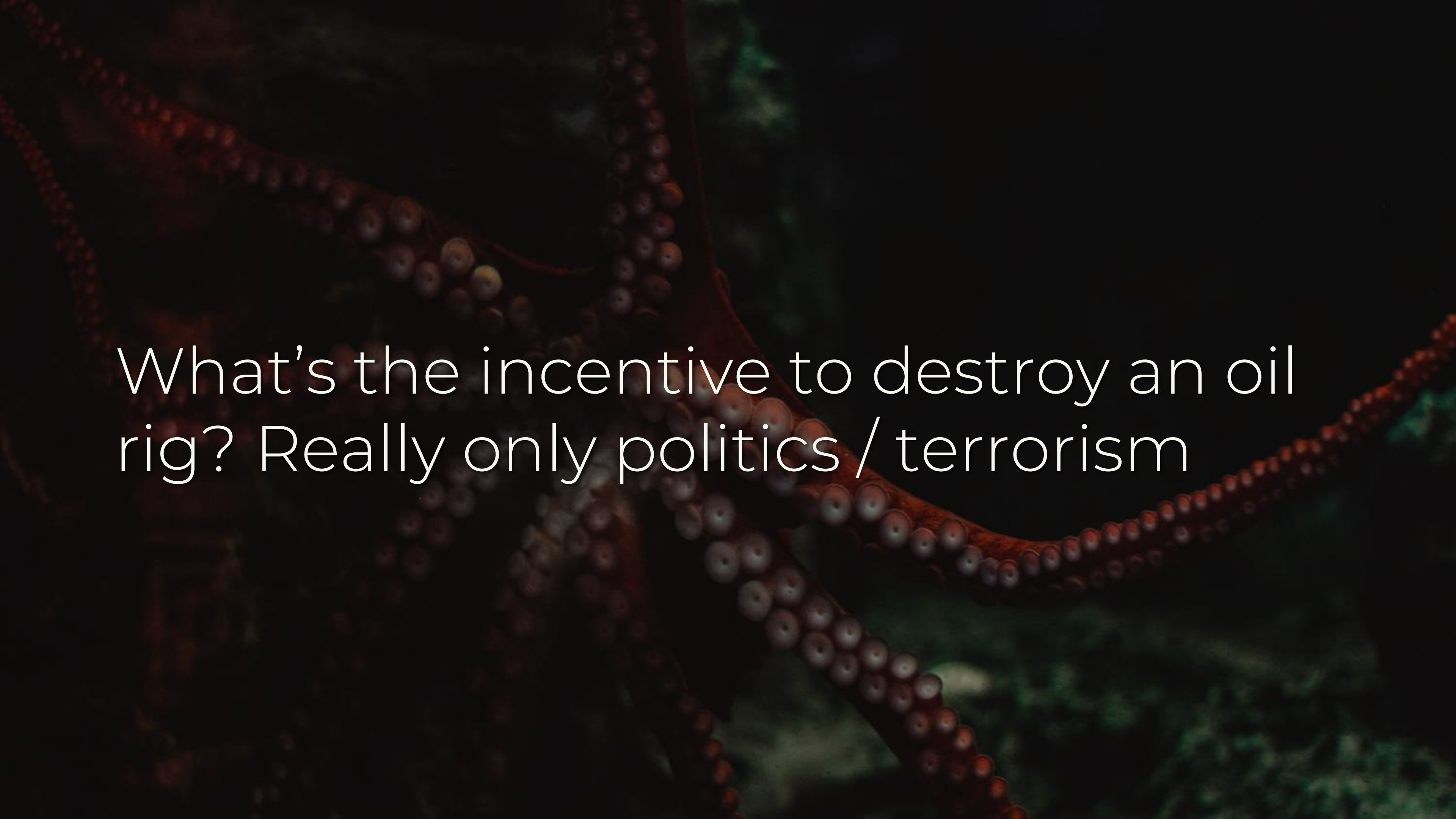
Offshore energy insurance often has an exclusion for cyber attacks

Coverage for cyber-physical damage covers up to $150mm - $400mm



Coverage for non-physical damage isn’t really there yet for offshore

Step 2: What do attackers want?



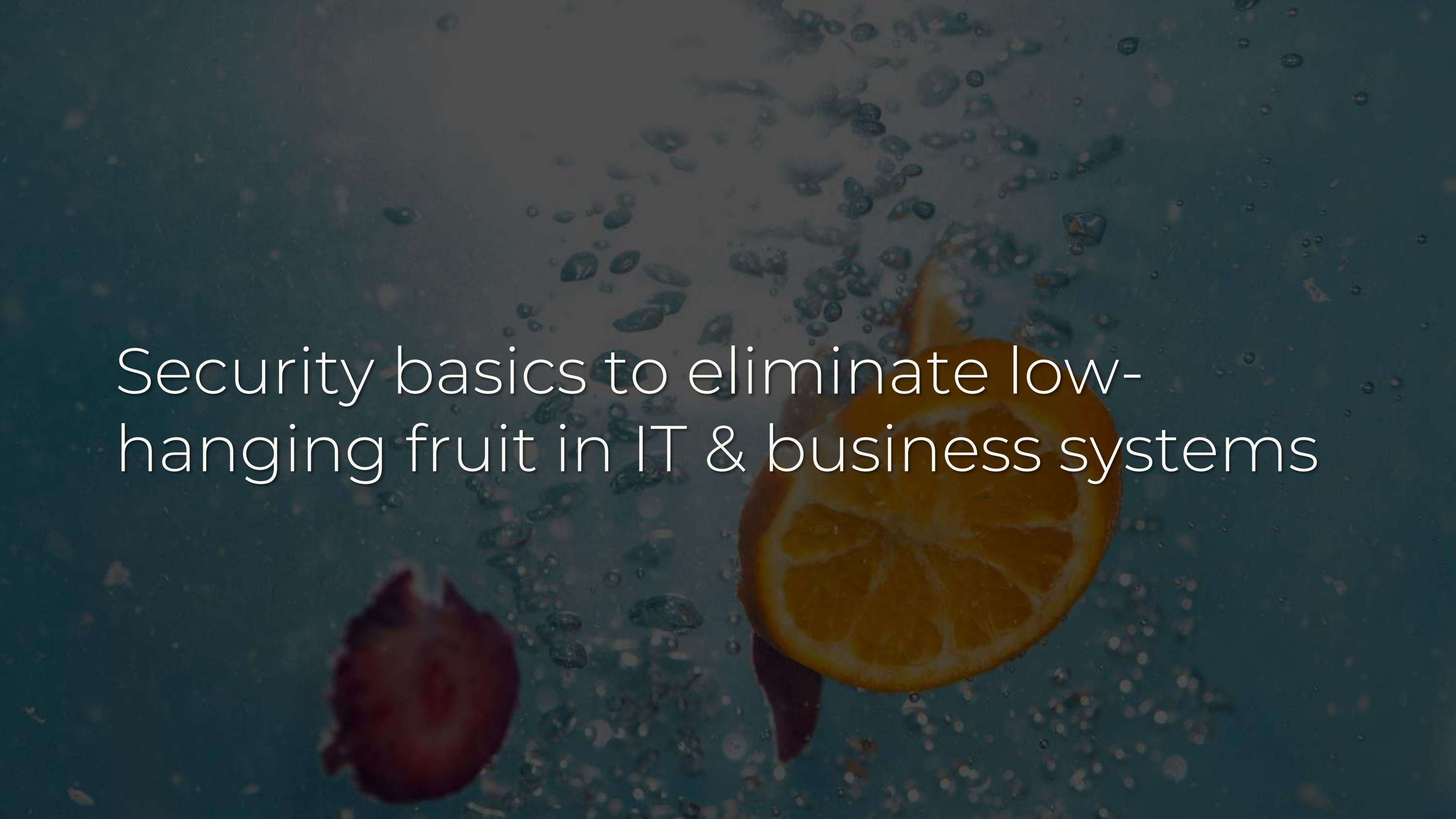
What’s the incentive to destroy an oil rig? Really only politics / terrorism

Nation-states also want leverage in negotiations – business data

BEC (e.g. CEO spam), DDoS (spam, extortion), IT system ransomware

Step 3: Where do Risk Factors & attacker goals align?

Security basics to eliminate low-hanging fruit in IT & business systems



Insurance, redundancy, & serenity prayer for physical assets

Telecom

Step 1: What are the risks & predominant revenue sources?

Uptime requirements, network disruption, service interruptions

Highly competitive envs, inability to role out new tech / modernize

Telecom companies = slow-moving, curious creatures

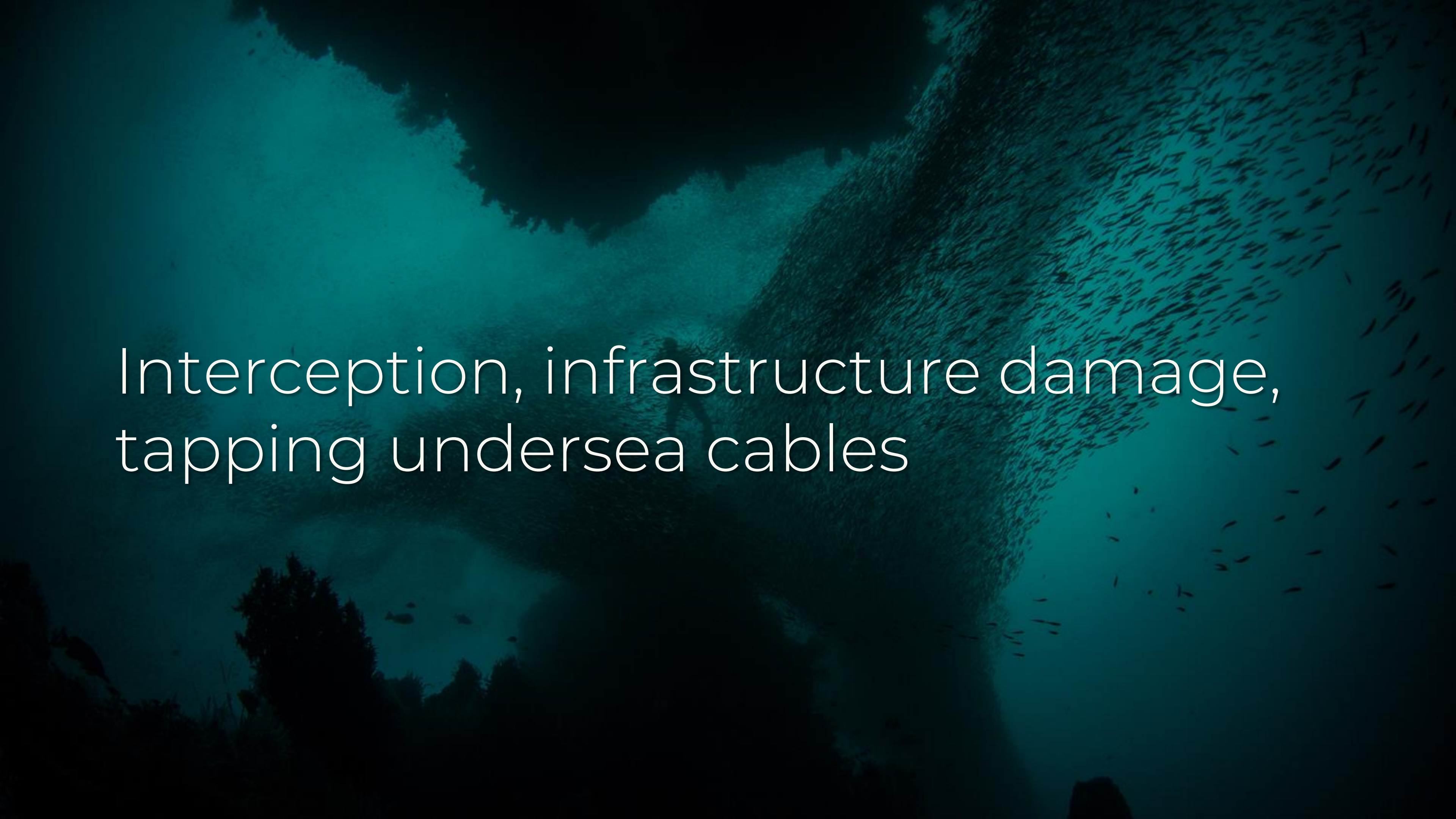
Curious about 5G (XML, JSON, REST), but slow-moving to adapt new tech

GDPR means PII may matter – privacy hasn’t been economical before

Region-specific: fraud in developing countries (eg roaming disruption)

Step 2: What do attackers want?

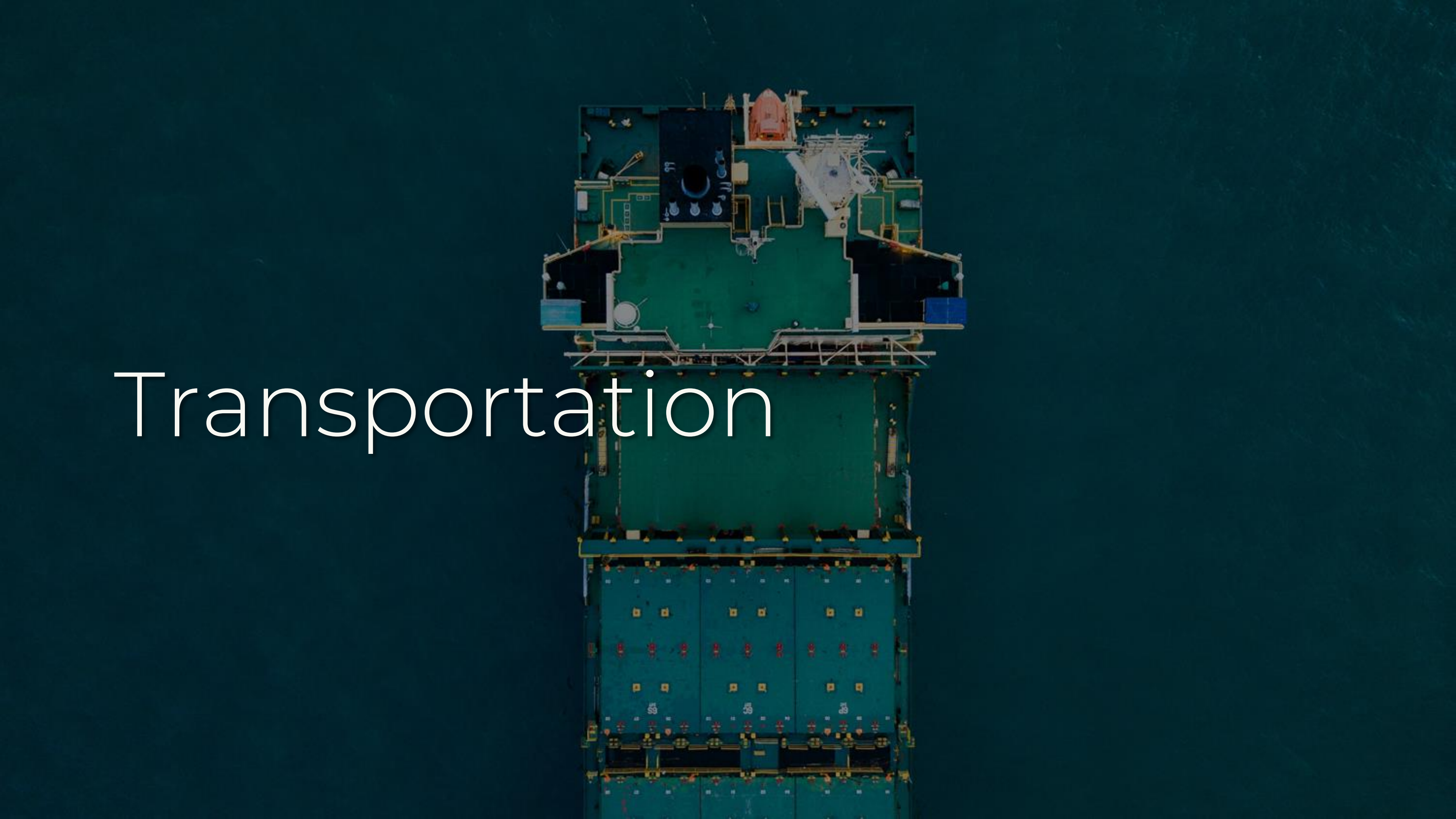
PII, fraud (so much fraud), SS7 to intercept 2FA, spam



Interception, infrastructure damage, tapping undersea cables

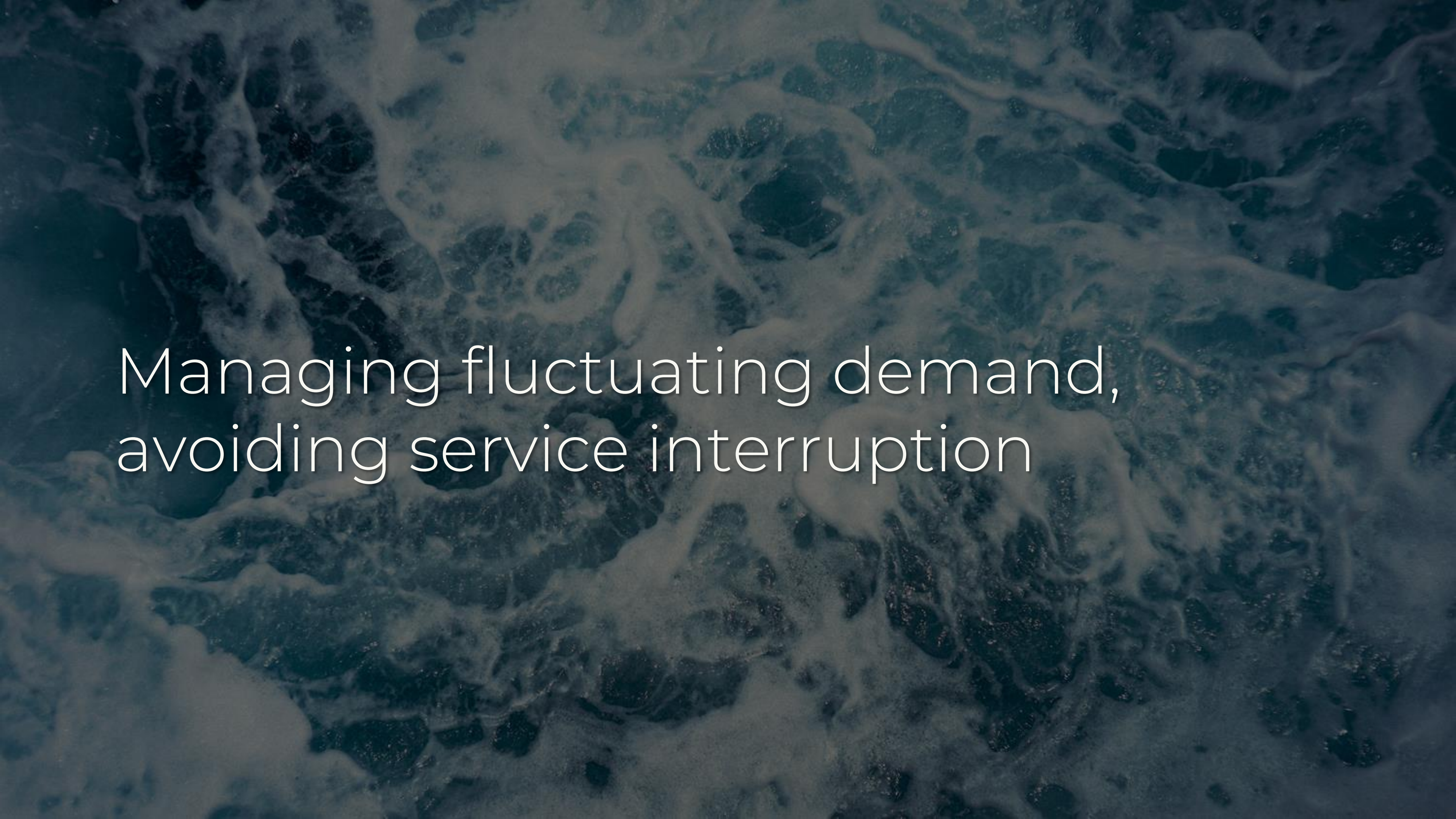
Step 3: Where do Risk Factors & attacker goals align?

Security basics to protect PII, improve network resiliency, API security



Transportation

Step 1: What are the risks & predominant revenue sources?

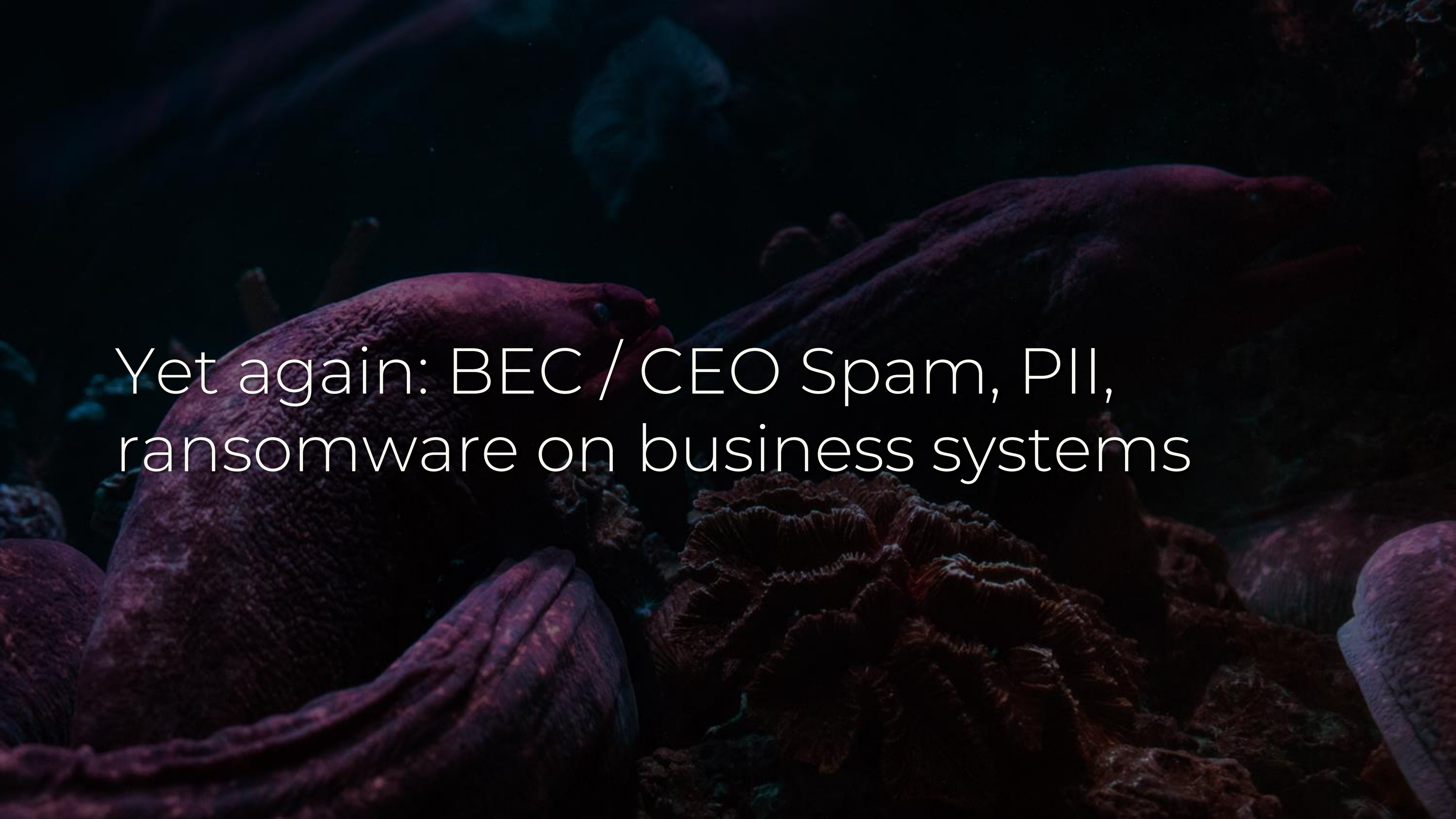


Managing fluctuating demand, avoiding service interruption

Hazardous materials, accidents, bad weather, piracy, public health threats

Reliance on tech improvements to operations & biz operations

Step 2: What do attackers want?



Yet again: BEC / CEO Spam, PII, ransomware on business systems

Transportation schedules can be used for theft or hijacking… but non-trivial

Drug orgs have redirected ships to gain containers for smuggling

Bridge systems: IBS or AIS theft, ECDIS misdirect… but non-trivial

Future opportunities: autonomous ships & ports, PTC, other automation

PTC is a security tire-fire – but you still must consider attacker ROI

Step 3: Where do Risk Factors & attacker goals align?

Security basics: email security, backups, network / comms resilience

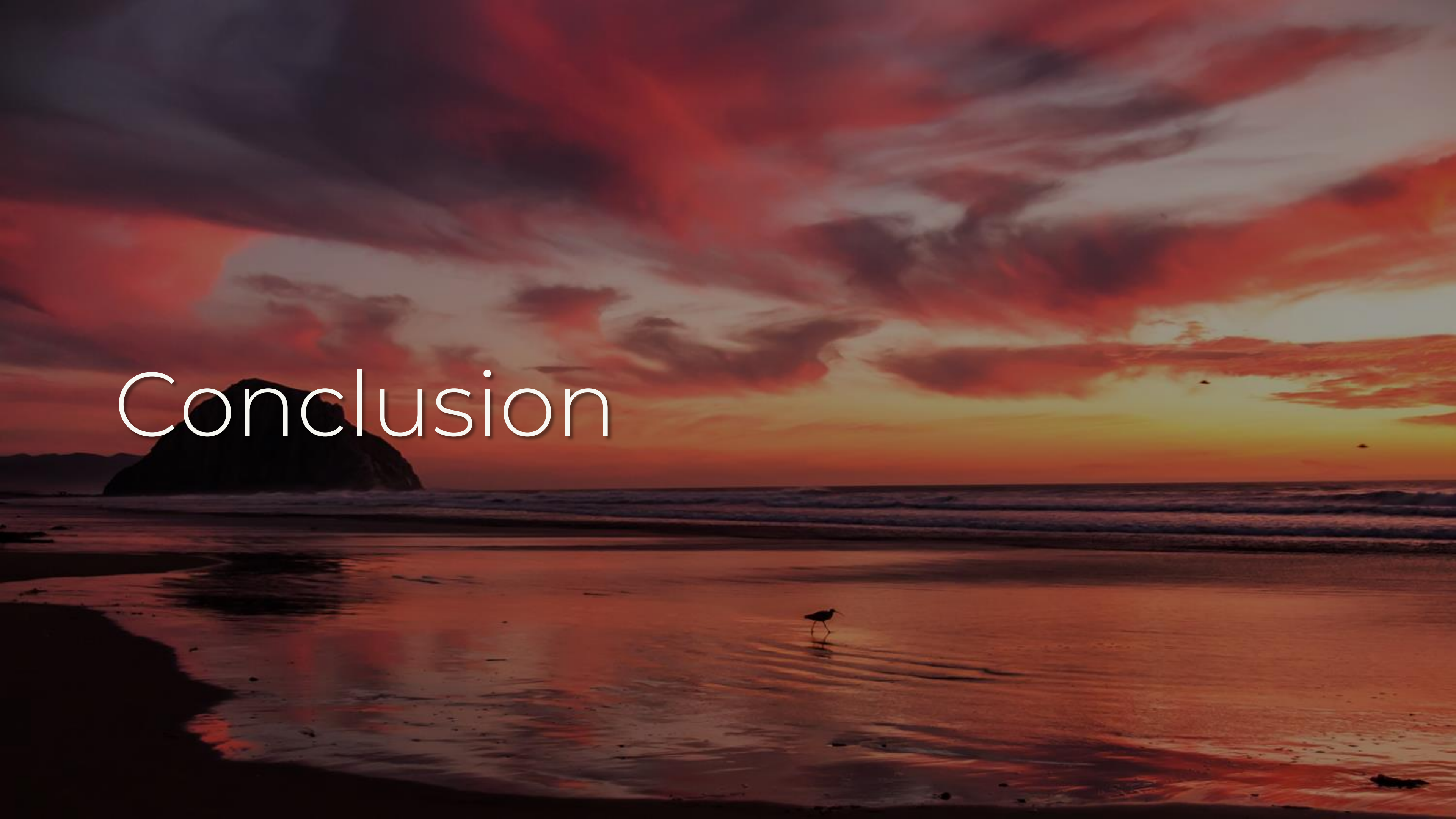
What is being insured by cyber insurance for transportation?

Physical damage is covered, except sometimes in “war risks” (terrorism)

Time element expense, eg systems failure, without physical damage

Cargo coverage includes damage, theft, misdirection, interruptions

Most data breaches involving PII are excluded, along with ransomware



Conclusion

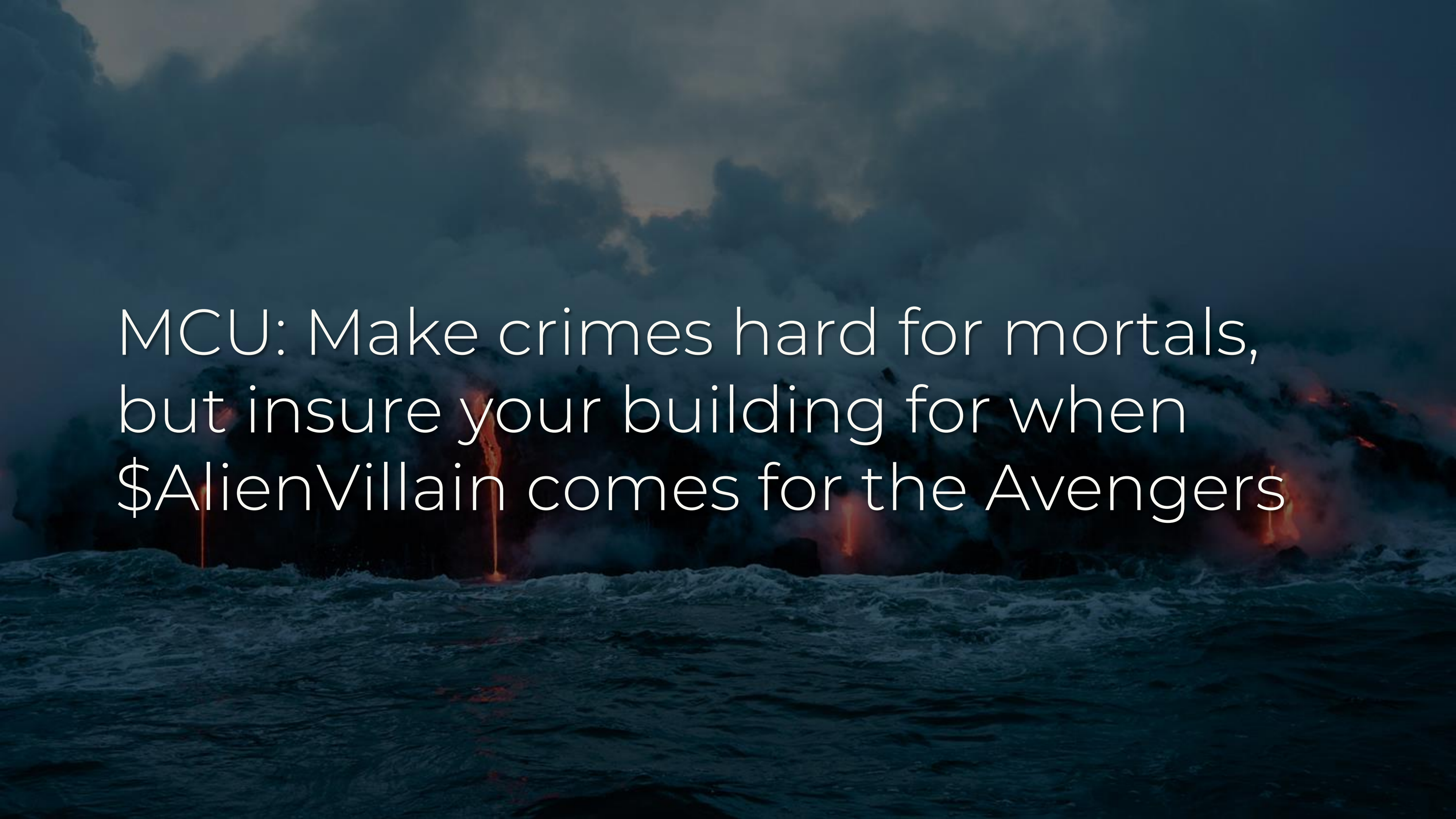
You don’t know better than your org on what business risks exist

Free yourself from the burden of defending against all threats

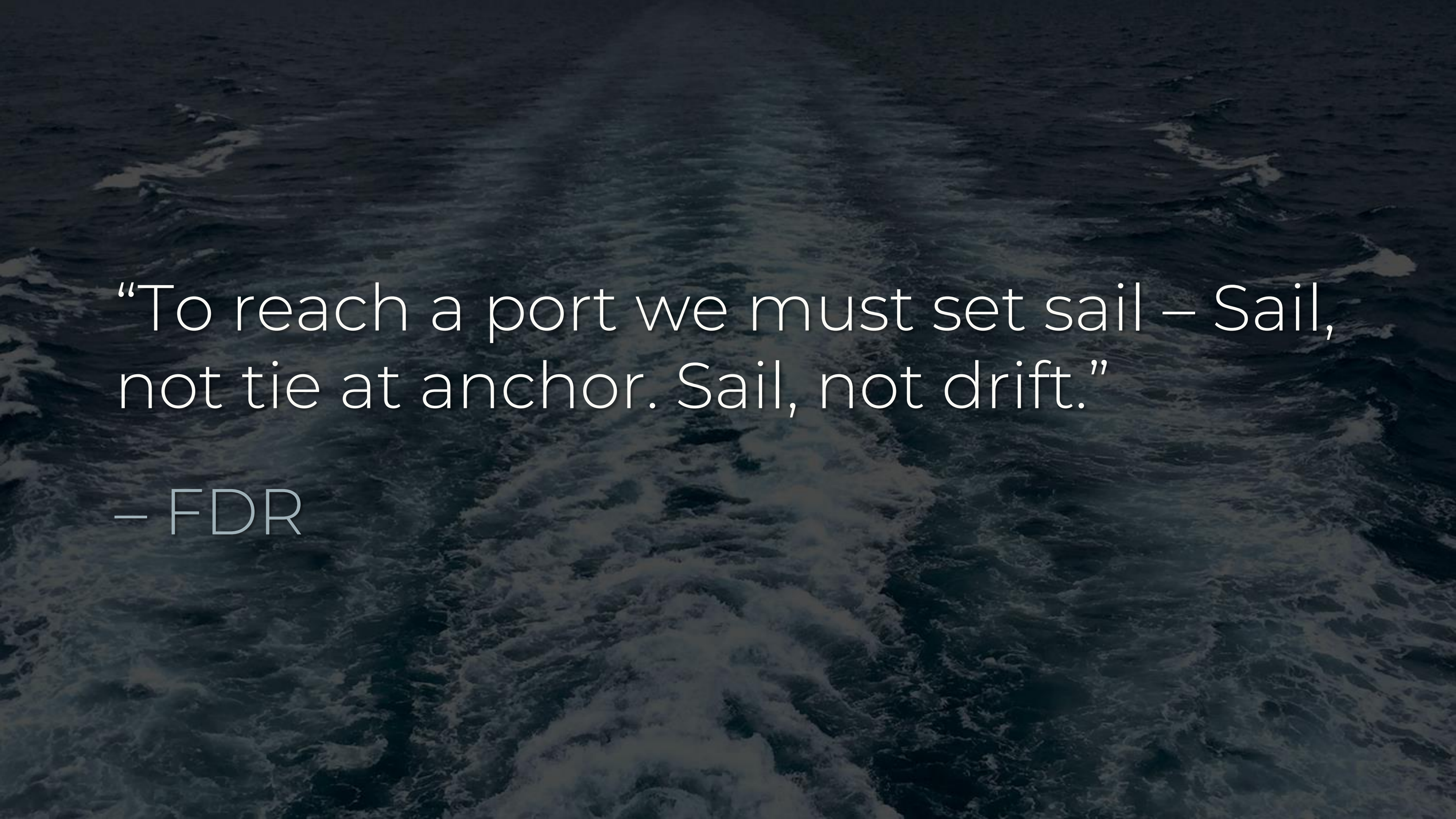
Where you can excel: how digital risks can connect to your business risks

Identify where your org’s risks meet what attackers actually want

Model how attackers most easily reach their goals & make it harder



MCU: Make crimes hard for mortals, but insure your building for when $AlienVillain comes for the Avengers



> “To reach a port we must set sail – Sail, not tie at anchor. Sail, not drift.”
>
> – FDR

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