# One Hundred Red Team Operations A Year

redteamwrangler

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Target Red Team

# Your Red Team

**The only wrong way to do Red Team, is to ignore the needs of your Blue Team.**

# Our Red Team

- Seven engineers
- Varying backgrounds, experience
- Tightly integrated with Blue Team
- Share cool stuff, with cool people

# Stakeholders and Partners

- Our Red Team supports and is supported by:
  - Incident response and management
  - Detection engineers
  - Security technology
  - Security testing
  - Vulnerability management
  - Intelligence
  - Internal business teams
  - Leadership

# Stakeholders and Partners

- Our Red Team is distinct from penetration testing team
- Mostly get to ignore vulnerabilities
- Focus on detection, response, and threat actor emulation.

# Operating Environment

- About 1,900 physical locations
- Some thousand manually maintained rules

# Operating Environment

Our Red Team is a major driver of consistency and reliability in detection and prevention across the enterprise

# Operating Environment

- Actively collect internal organizational information
- Track emerging products and technology
- Collaborate with internal threat intelligence team

# Operational Cadence

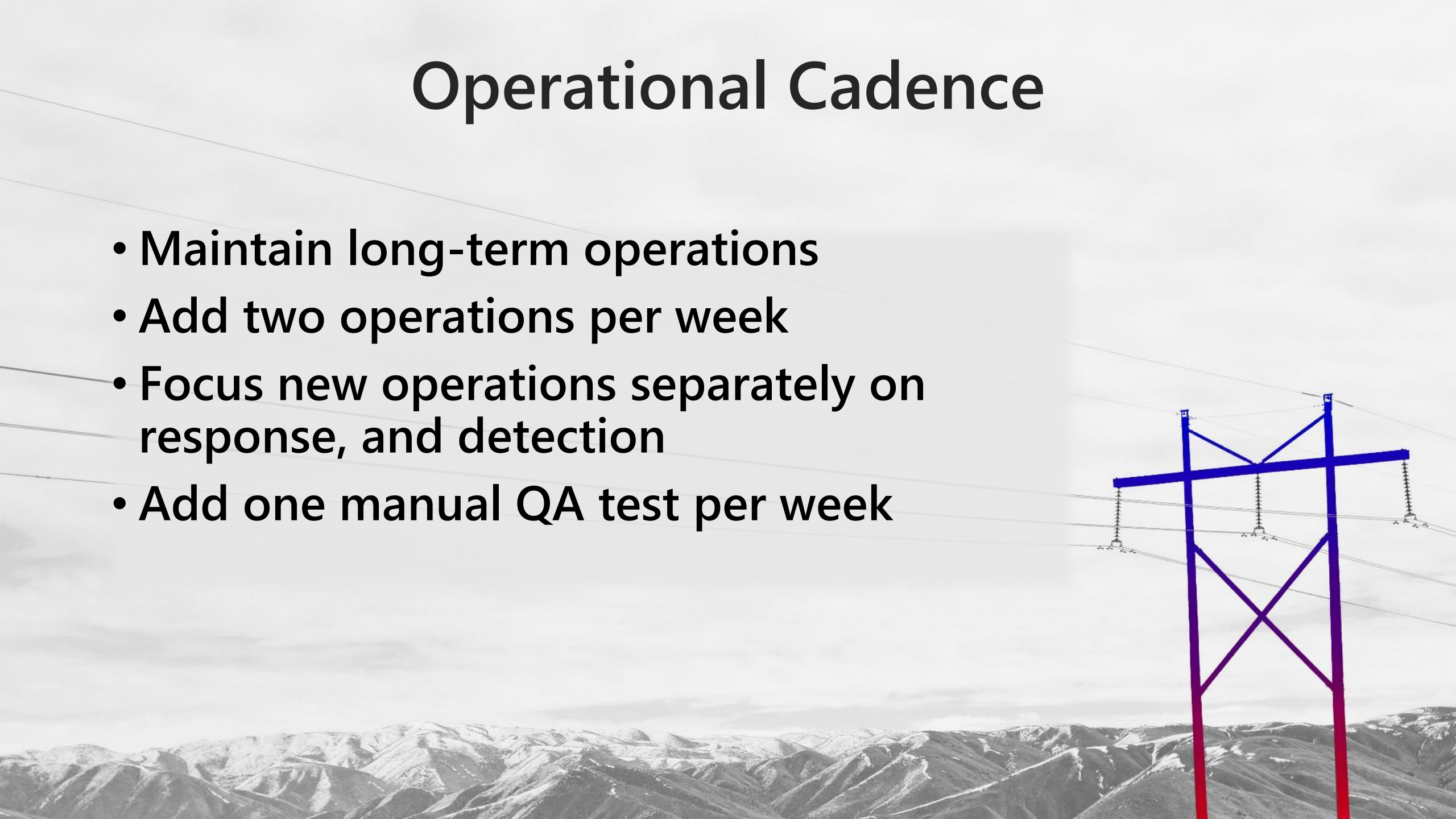
- Initially, using a few long-term operations a year
- Discovered we were not getting enough good data
- Strong variability in the response process

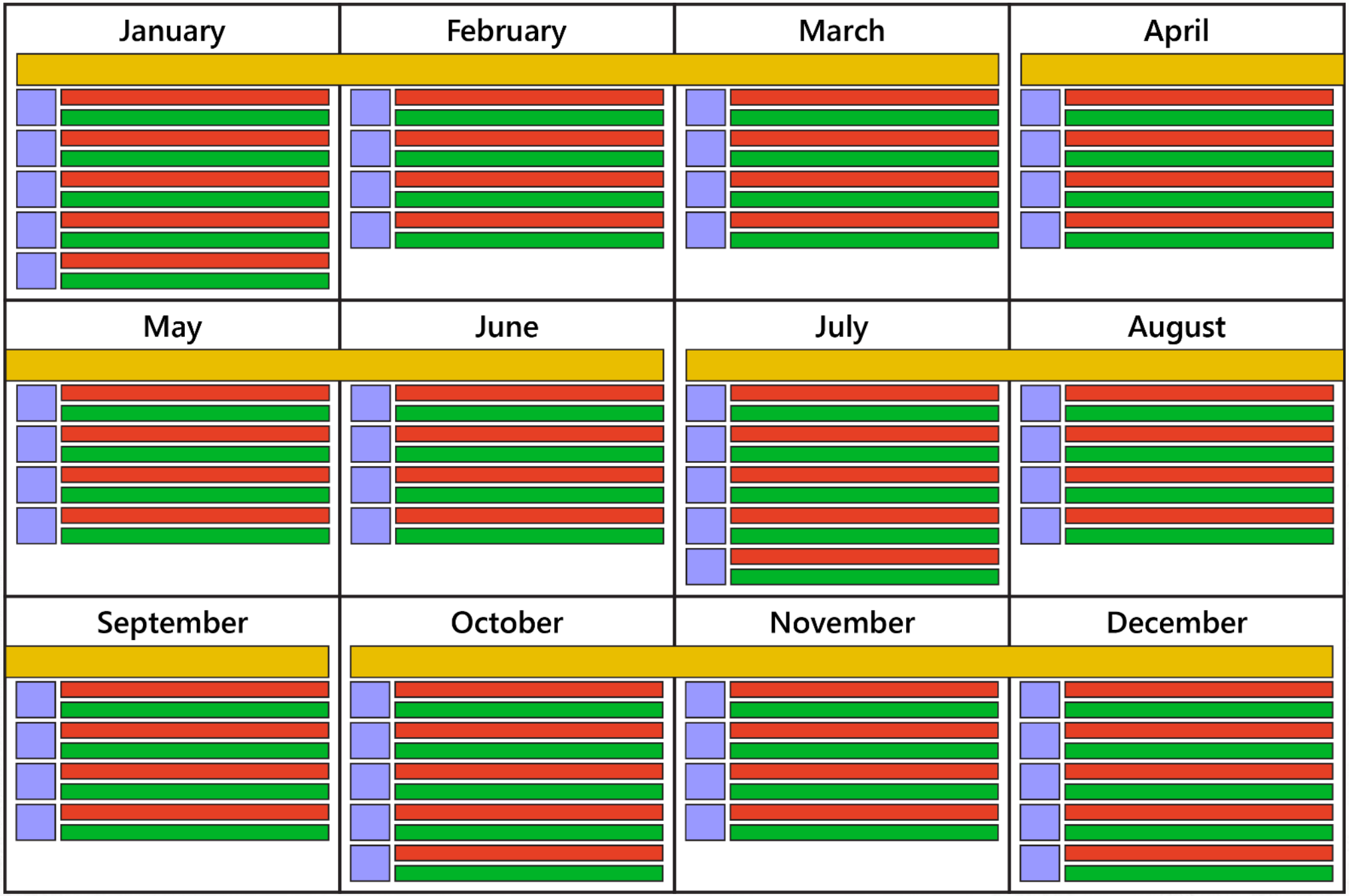
# Operational Cadence

- Can we improve faster with more frequent exercises?
- Short operations do not always allow high levels of sophistication

# Operational Cadence

- Maintain long-term operations
- Add two operations per week
- Focus new operations separately on response, and detection
- Add one manual QA test per week

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# Volunteer Access

- Too many operations to start all from zero access
- Greatest value is in techniques AFTER initial access

MITRE ATT&CK™

# Volunteer Access

Initial Access

Execution

Persistence

Privilege

Escalation

Defense Evasion

Credential Access

Discovery

Lateral Movement

Collection

Command and Control

Exfiltration

Impact

# Volunteer Access

- Volunteers will carry out the actions typical for end users involved in cases
- Volunteers do not usually use their daily-driver hardware

# Volunteer Access

- Incident response has some business impact
- Our operations have very low business impact
- Maintains a positive relationship with our business
- Engage our people with Red Team exercises

# Infrastructure and Development

- Ad-hoc approach failing
- Stale, complicated infrastructure
- Manual maintenance prevented scaling

# Infrastructure and Development

- Complete tear-out and retraining
- New cloud environment
- Deploy, destroy
- Deployment completion in minutes

# Infrastructure and Development

- Automated infrastructure
- Simple team member deployment
- Tested, stable releases
- Flexible, mutable instances

# Infrastructure and Development

# Infrastructure and Development

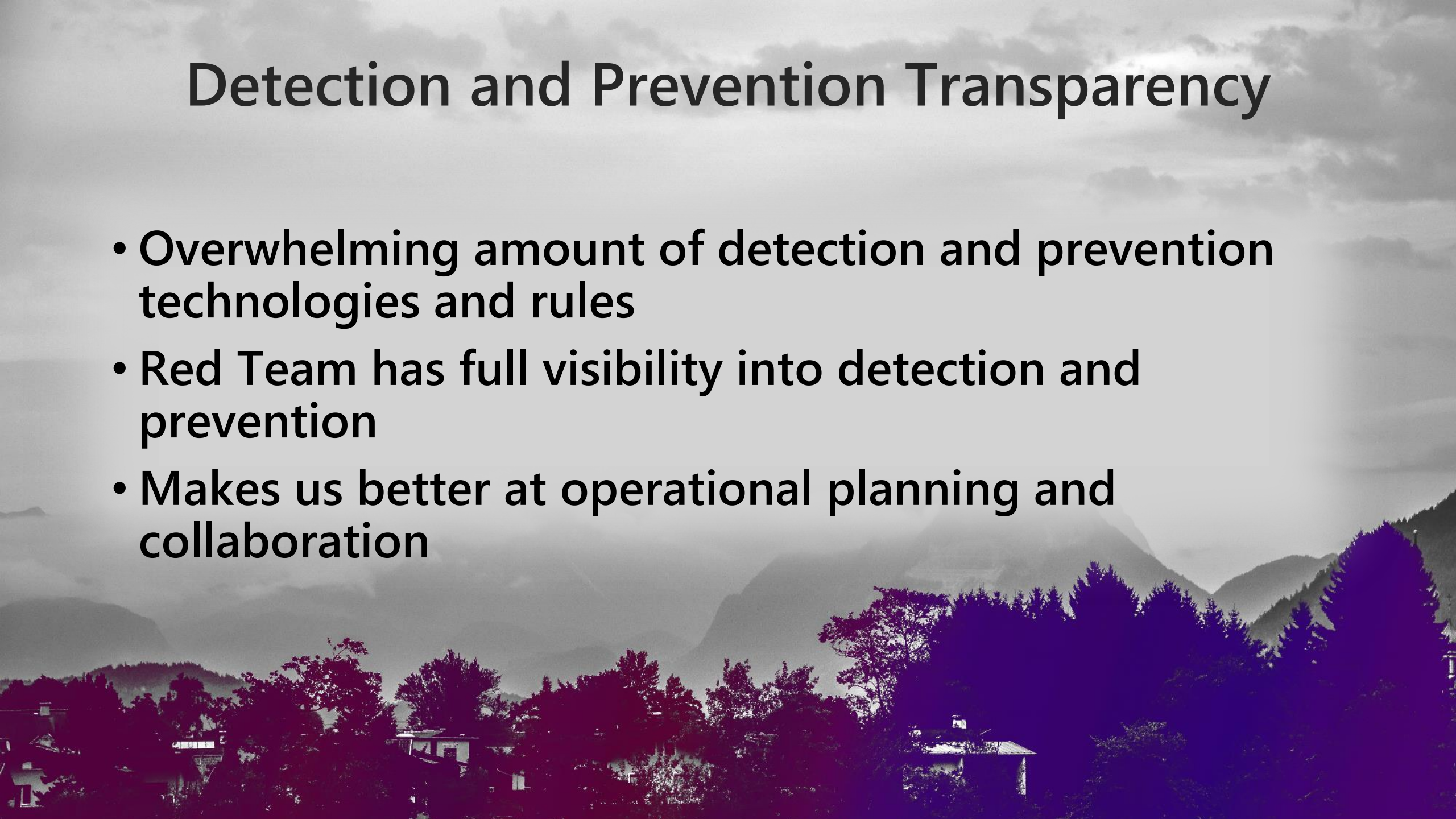
- Red Team does DevOps!
- Kinda-Agile
- Much of development planned up to a year in advance
- Security baked-in

# Infrastructure and Development

- Focused on Minimum Viable Product
- Well documented
- Everyone is empowered to participate in collaborative feature development

# Detection and Prevention Transparency

- Overwhelming amount of detection and prevention technologies and rules
- Red Team has full visibility into detection and prevention
- Makes us better at operational planning and collaboration



# Detection and Prevention Transparency

Transparency saves us
a lot of time.

# Shared Collaboration

- Using in-house rule documentation tool
- Red Team shares physical space with Blue Team
- Shared Red/Blue chat rooms

# Documentation

- Simplified reporting
- Reports are shared to a large Blue Team group

# Red Team Weekly 2019 01 01

This page was edited 12 hours ago · 8 revisions

## Notes

This operation was against a Windows host using a spearphishing email, containing a link to a macro-enabled document. Persistence was installed and exfiltration performed.

## Tester Details

| Username | UserID | Hostname | IP Address | Notable Access | Notes |
|---|---|---|---|---|---|
| jonathan.doebert | jdbrt | AYYYU37 | 10.0.0.15 | Travis, CircleCI, TeamCity | CD/CI Admin |

## Delivery

| Date | Type | Sent | Received | Downloaded | Note |
|---|---|---|---|---|---|
| 2019-01-01 | E-mail | 12:30 PM | 12:31 PM | 1:12 PM | Email with link to doc in body |

## Execution

| Date | Payload Execution |
|---|---|
| 2019-01-01 | 1:15 PM |

| Date | Last Activity |
|---|---|
| 2019-01-02 | 25:04 PM |

## Exfiltration / Data Staging Notes

Exfil was performed in two stages. The first stage failed to fire an alert. Approximate total successful volume was 2.1 GB.

| Date | Exfil Start | Data | Amount | Source File Name(s) |
|---|---|---|---|---|
| 2019-01-01 | 1:58 PM | Registry | 1.1 GB | C:\users\jdbrt\Desktop\registry.gz |
| 2019-02-02 | 10:57 AM | Registry | 497 MB | C:\users\jdbrt\Desktop\system.gz |
| 2019-02-02 | 11:10 AM | Registry | 437 MB | C:\users\jdbrt\Desktop\user.gz |

## C2 Server DNS/IP

| DNS | IP Address |
| --- | --- |
| 135.39.228.18 | uyyyu.example[.]com |
| 135.39.228.18 | ksajh.example[.]com |
| 135.39.228.18 | xnoqi.example[.]com |

## Email Details

| Date | Sent | From | To | Subject | Note |
| --- | --- | --- | --- | --- | --- |
| 2019-01-01 | 12:30 PM | haxfan@example[.]org | jonathan.doebert@target.com | Aggressive Deals in 0-day Selections | Link in body |

## Payload Details

| File Name | Location/URL | MD5 | Notes |
| --- | --- | --- | --- |
| scaefnoocnase.doc | https://example[.]com/downloads/scaefnoocnase.doc | 30f72264345c269b093502e282e506a2 | Macro-enabled Office Document |
| backup.exe | c:\users\jdbrt\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup | 2a044a3bfb5ec73a4807334b68f5250c | Implant Binary - Persistence |

## TTP Attribution

The implant is a tool commonly used by the actor known as NIN2, the malware used in this operation. This actor leverages other common tools such as Mimikatz and PCAnywhere.

https://www.supermalware.com/2017/11/23/nin2-hackers-steal-socks/

NIN2 was associated with links to malicious macro-enabled documents in the bodies of emails.

https://www.fireelbow.com/Spear-Phishing-NIN2-Revenge-of-the-Doc.html

## Alert

| Date | Alert | Result |
| --- | --- | --- |
| 2019-01-01 | Prod-Proxy-HTTP-Exfil-1.44-MB | Not fired |
| 2019-01-02 | Prod-Proxy-HTTP-Exfil-1.44-MB | Fired |

## Case Number

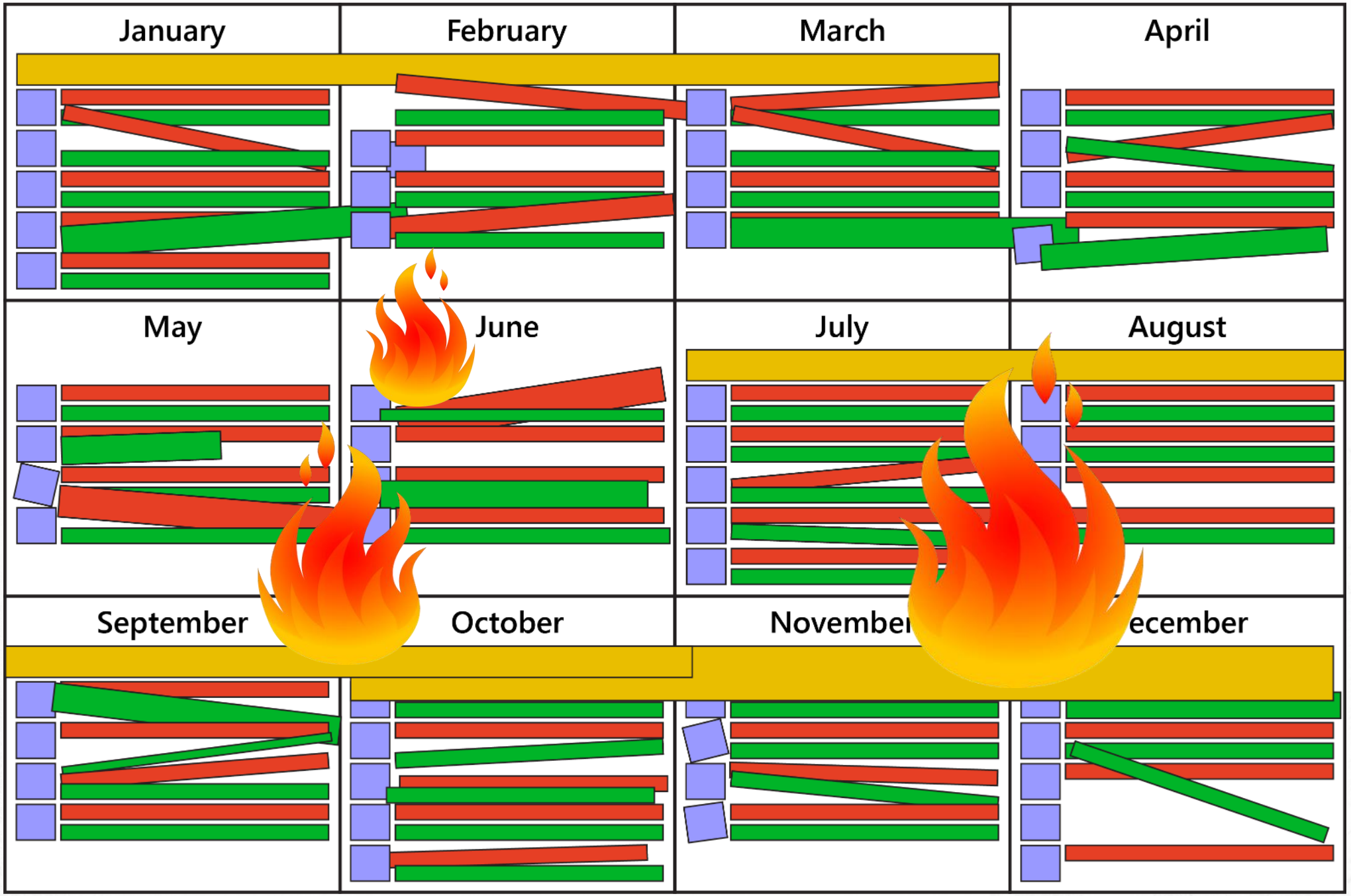
62773

# Escalation Partnerships

- Unnecessary escalation risk is increased
- Key partners are read in on Red Team operations
- Teams are empowered to de-escalate
- Red Team on-call

# Operational Diversity

- Burning out on too many similar and labor intensive operations
- Long-term operations suffering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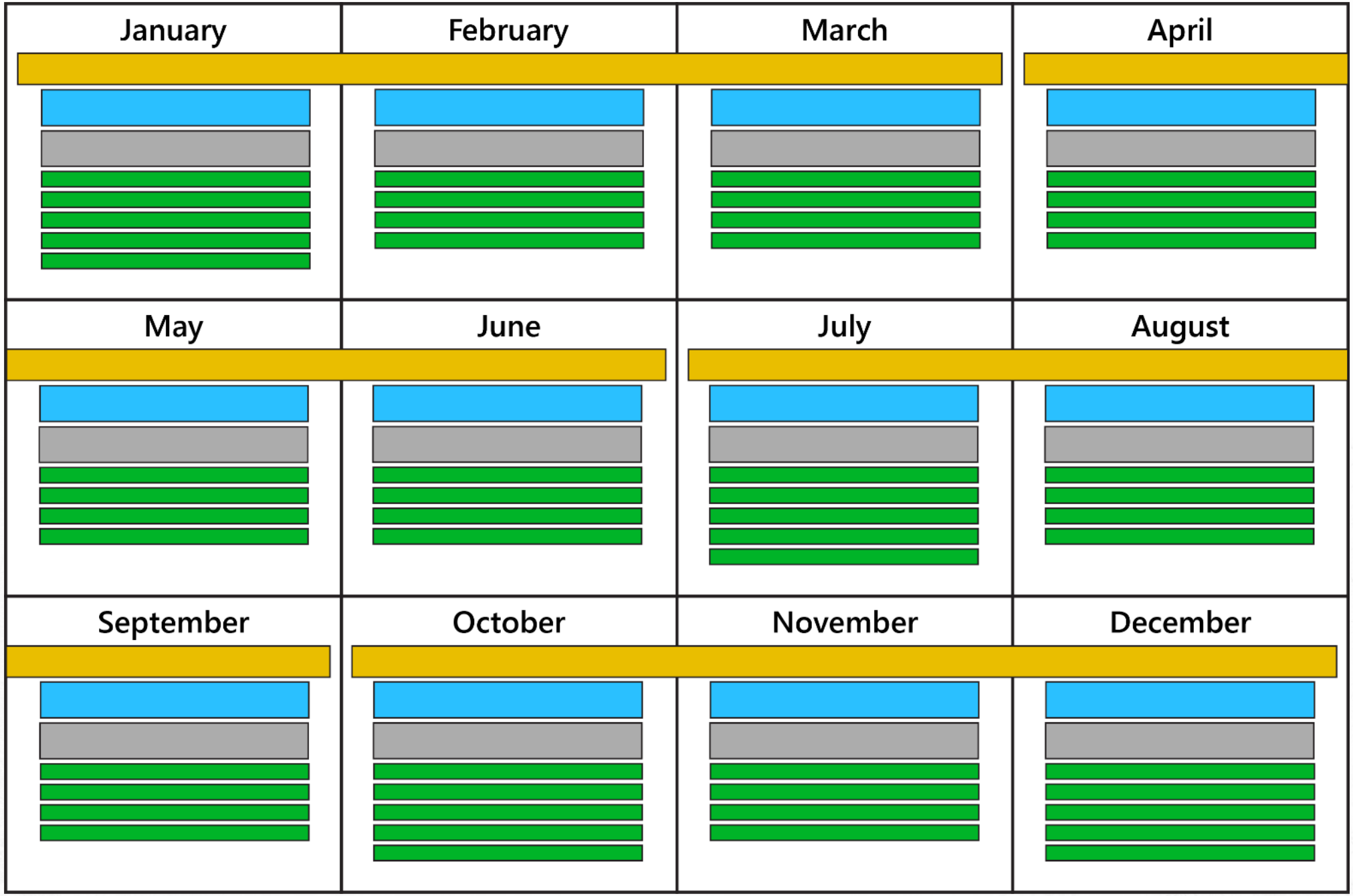
# Operational Diversity

- Finding a way to mix things up, and improve outcomes
- New types of operations, new objectives
- Adding new automated end-to-end test capabilities

# Operational Diversity

- A few strategically focused long term operations
- Two monthly detection and hunt focused operations
- A single weekly, response focused operation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# Operational Diversity

- Automate security QA testing
- Change ownership of automated security QA testing to another engineering team
- Maintain support to assure testing meets expectations
- Increase test frequency and coverage dramatically

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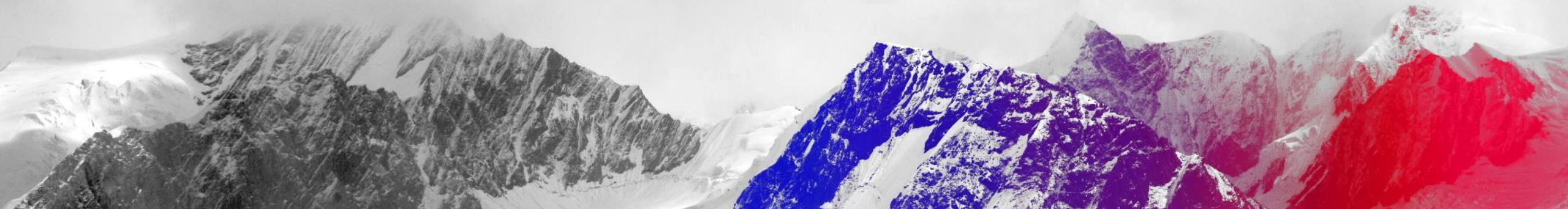
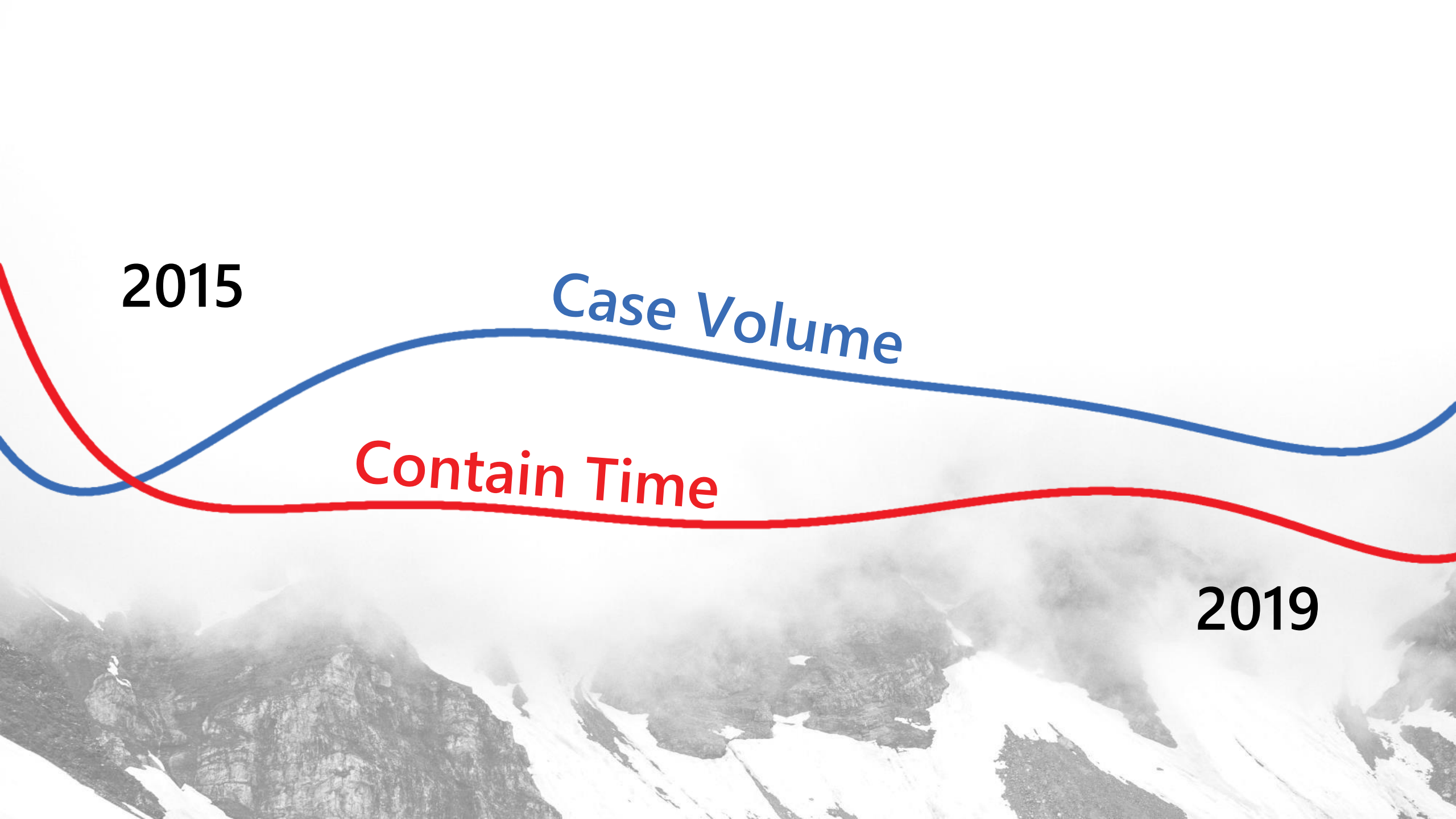
# Continuous Improvement

- Security measurement team
- Red/Blue facilitator
- Collects, compares, and reports on operational data
- Leads operation debriefs



# Continuous Improvement

- Entire timeline of operational events reviewed
- Action items taken by stakeholders, and tracked until resolved

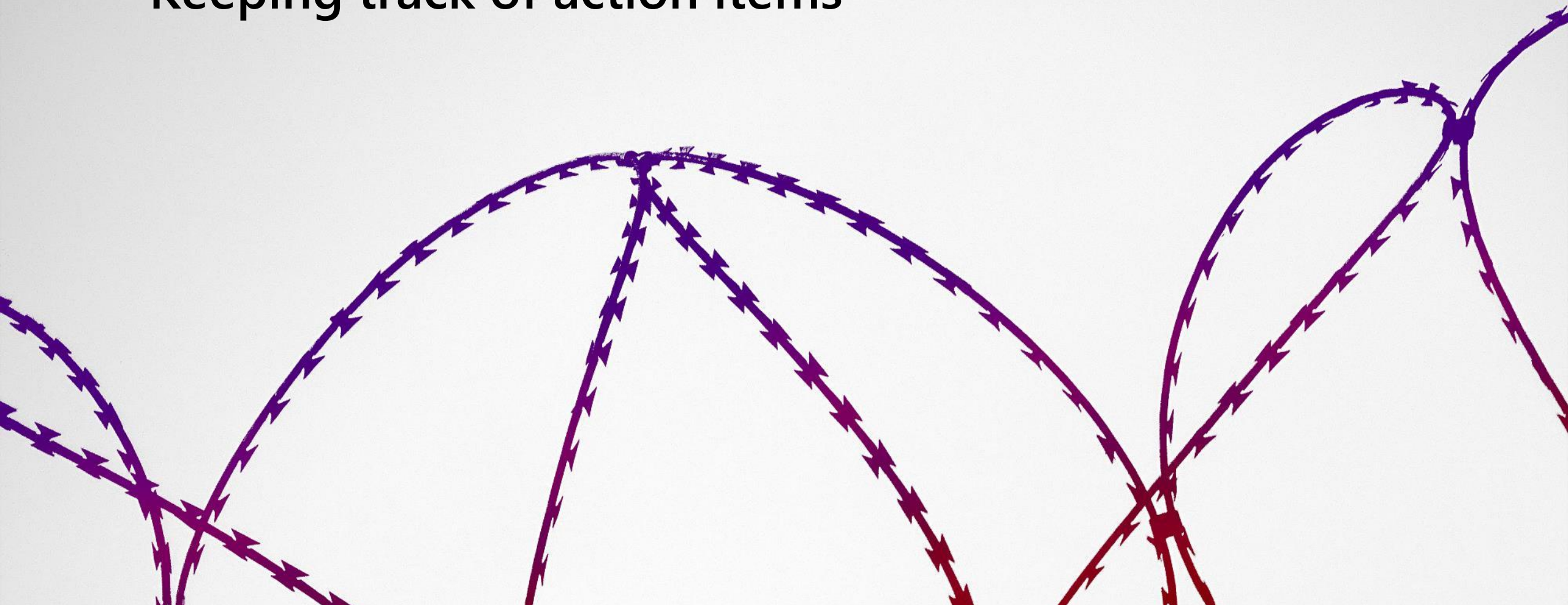

2015
Case Volume
Contain Time
2019

# Continuous Improvement

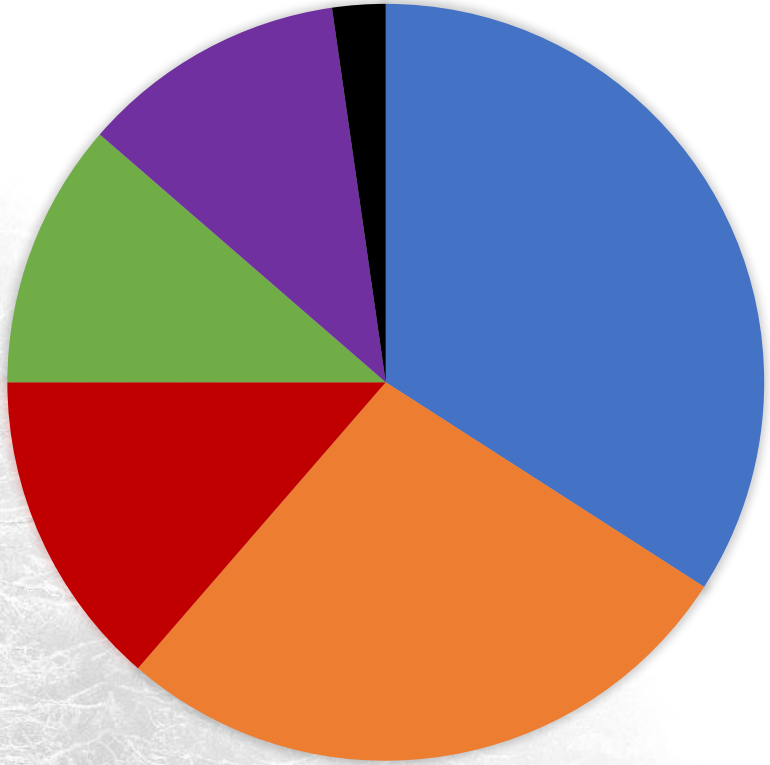
- Connects regularly with management as a data-backed advocate for security improvement

# Measuring Performance

- Keeping track of action items



# Red Team Generated Action Items



## Process
New or updated process or policy

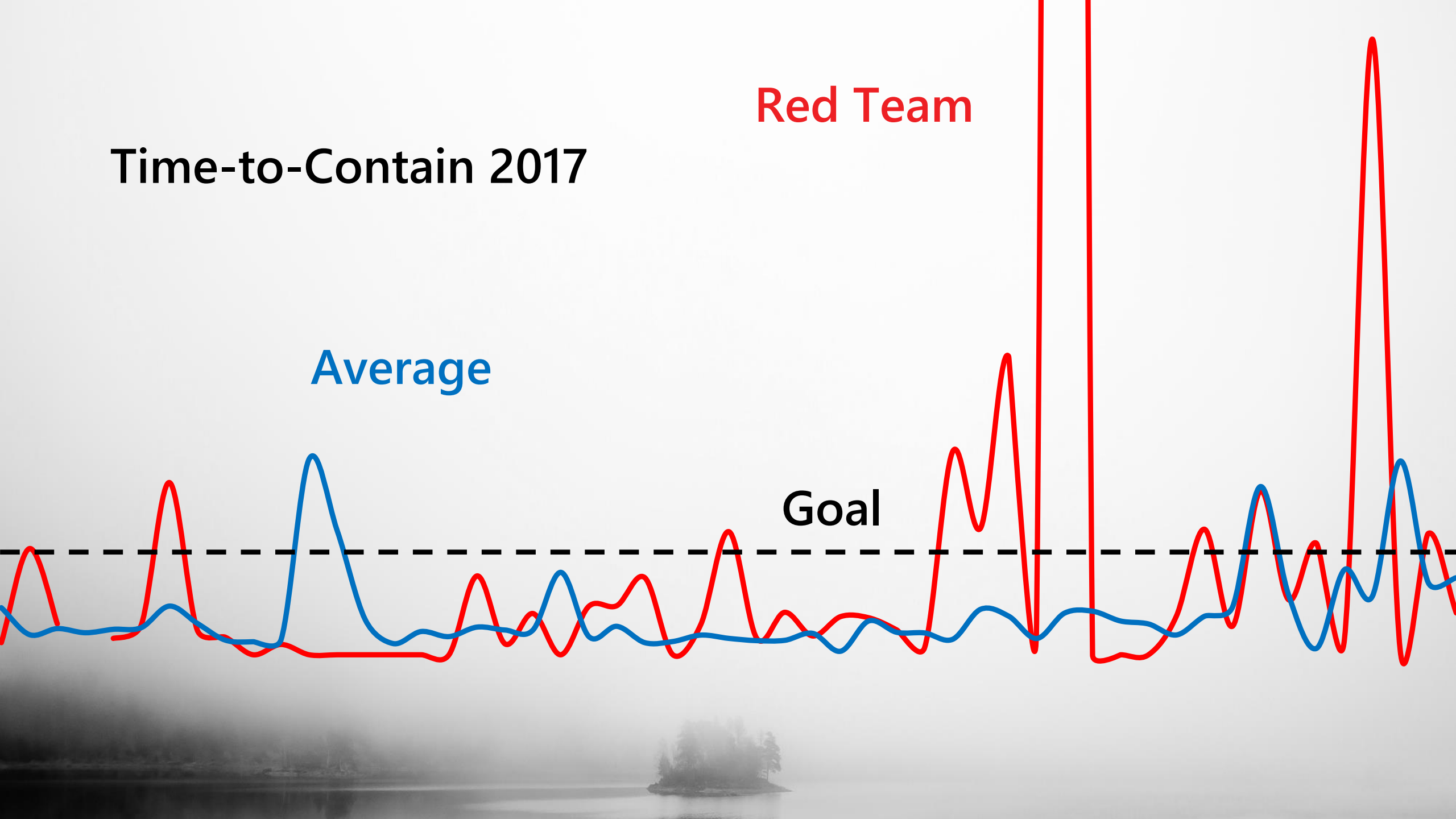
## Technology
New or updated technology

## Detection
New or updated rules

## Prevention
Improved prevention behavior

## Training
New or updated training

## Visibility
Additional sources

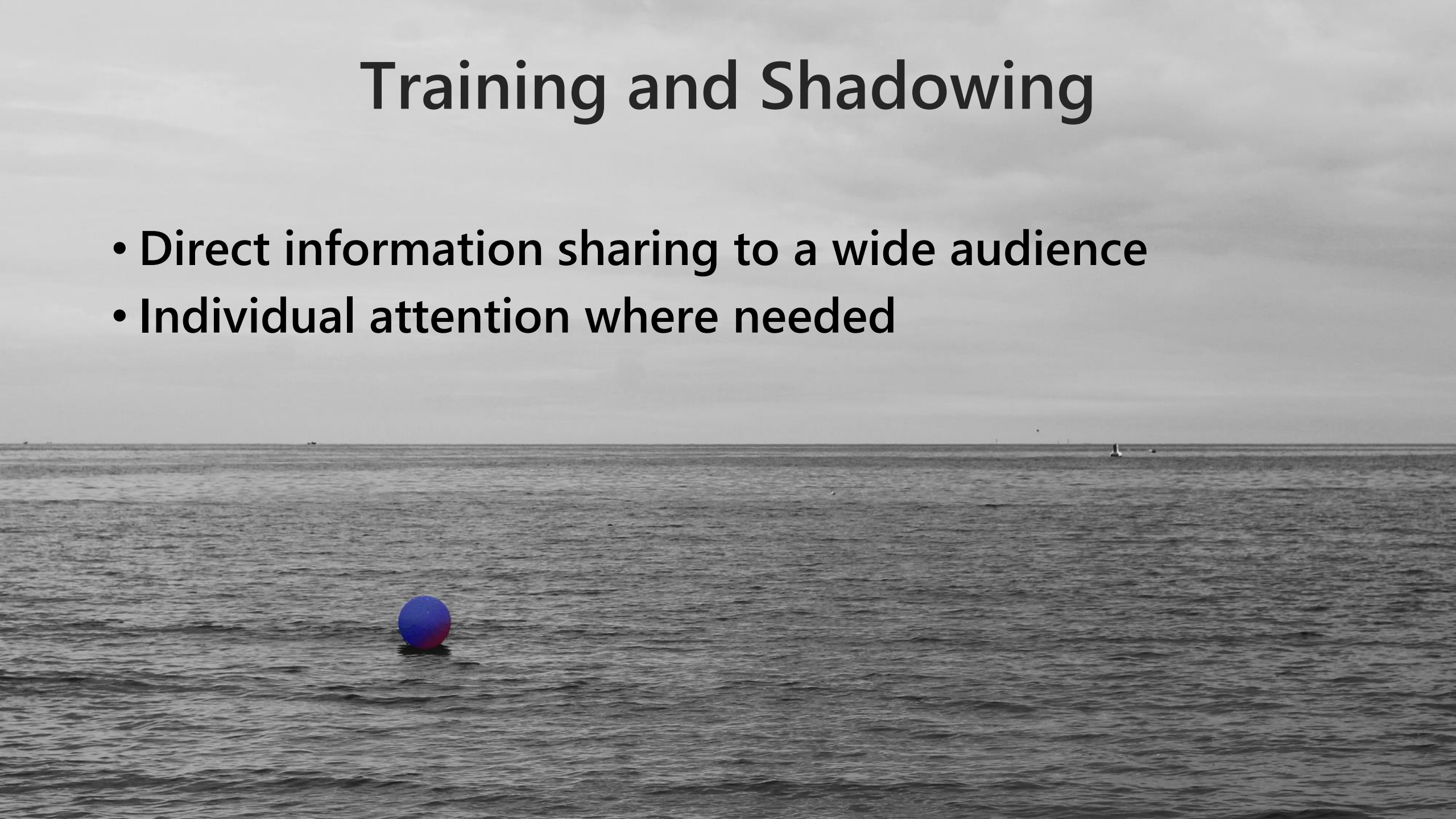

Time-to-Contain 2017
Red Team
Average
Goal

# Measuring Performance

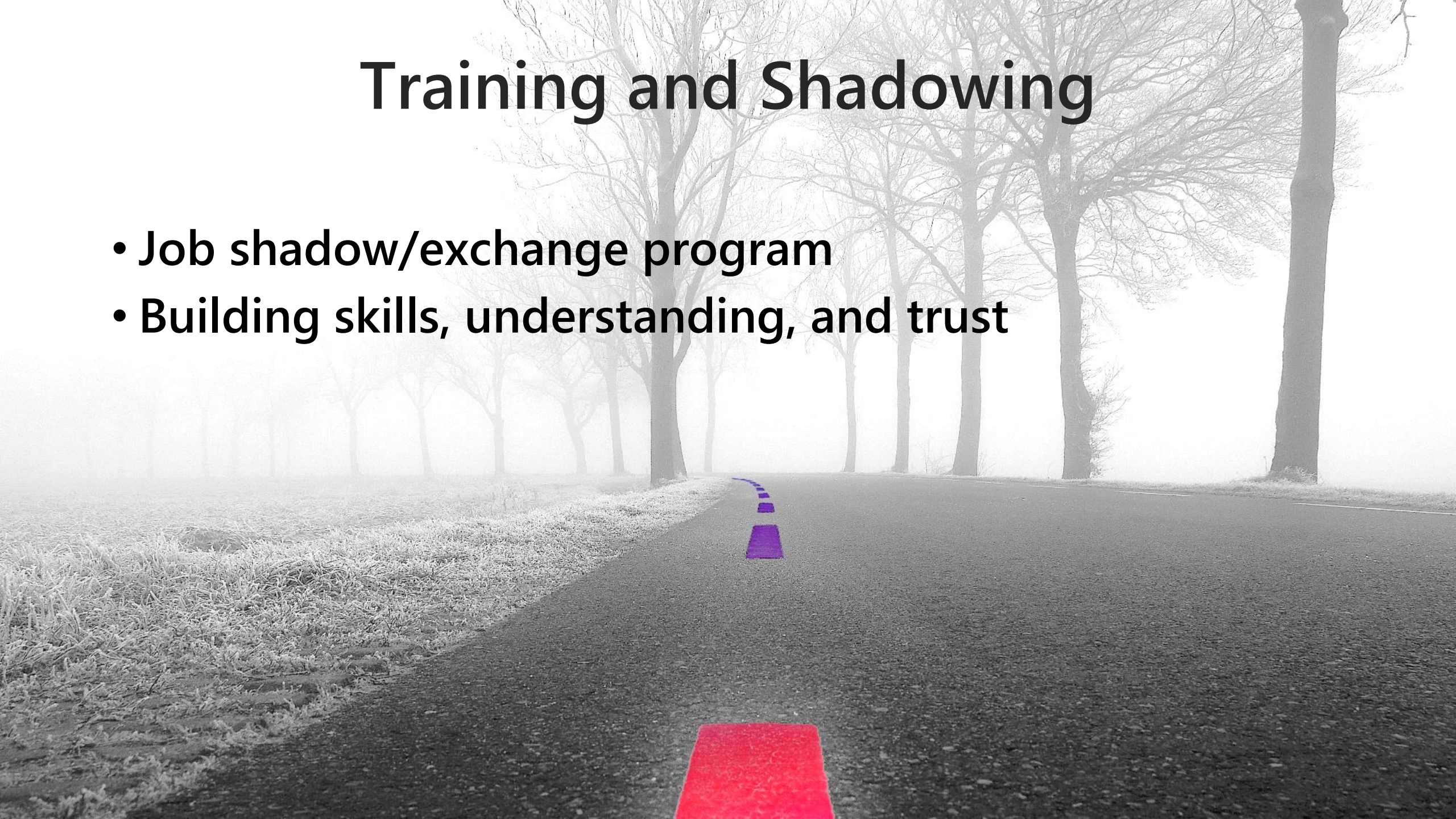
- Setting straightforward operational goals
- Making sure operations happen consistently
- Every “failure” is a learning opportunity

# Training and Shadowing

- Direct information sharing to a wide audience
- Individual attention where needed



# Training and Shadowing



- Job shadow/exchange program
- Building skills, understanding, and trust

# Conclusion

- We are an engineering team
- We are an operational team
- We are tightly integrated
- We are measured
- We do cool stuff, quickly