NITTF Tech Talk – Trends in Insider Risk Quantification, Part 3

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Document Markings

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From Our Last Tech Talk

Test your technical controls in a test environment, and not in production

To do this, you'll need:

- Virtual Environments, e.g., https://github.com/cmu-sei/crucible
- User Simulation, e.g., https://github.com/cmu-sei/GHOSTS

← Today's Focus

Use Cases to Consider

Operational

- Example: measure alert volume, validate alert accuracy

Coverage

- Example: measure percentage of indicators covered by monitoring system(s)

Latency

- Example: measure average time between activity and alert, alert throughput

Compliance

- Example: validate percentage of recommended / required (NIST SP 800-53, NITTF Minimum Standards) controls implemented

Testing and Validation

Candidate Controls

- Faulty indicators
- Faulty monitoring tools
- Legacy Systems

Tune existing policies

- Overly active alerts

Data Sources

- Exploratory Analysis

Security Testing

- Assume the identity of an insider
- Training opportunities

•Software Tools

- Commercial
- Open-Source

New Deployment Environments

- Yellow/Red/Green Networks
- Federated SIEM

Functional Requirements for Simulation

•Technical observables:	Enterprise and personal email
	Multi-browser web usage
	File operations (create/read/update/delete)
	Using Cloud storage software
	Removable Media
	Virtual Private Networks
	Printers/Scanners
	Remote Administration
•Behavioral observables:	Organizational structure
	Privileged and Non-Privileged users
	Personnel Events (performance reviews, complaints, reprimands, travel)
	Realistic work schedule

https://insights.sei.cmu.edu/blog/functional-requirements-for-insider-threat-tool-testing

Reference Approach

Configurable

- Adjust security controls, vendors, user behavior

Decoupled

- Data generation should not rely on specific tools or outputs

Controlled/Repeatable

- Follow a sound scientific method

Accessible

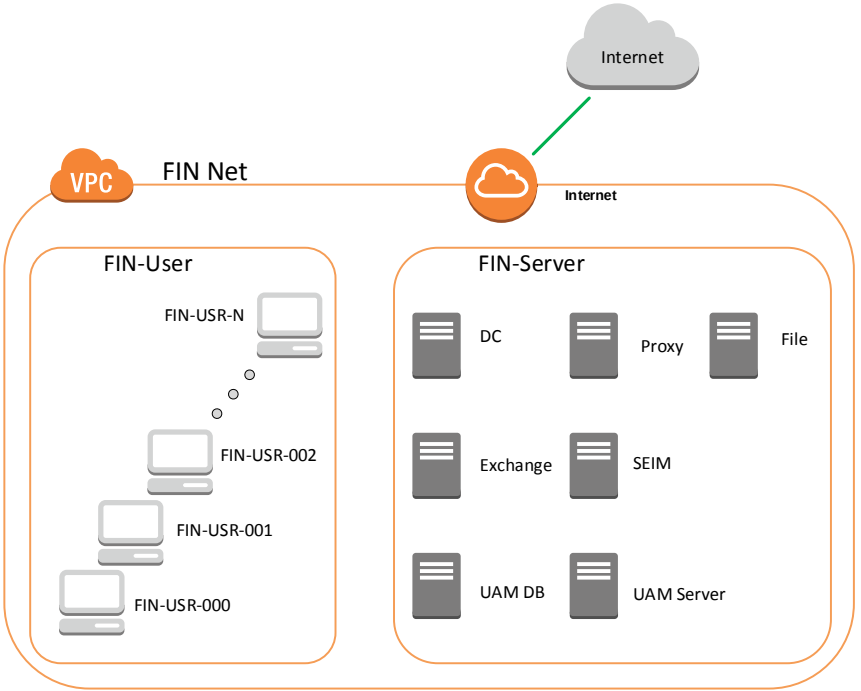
- Stakeholders, vendors, or third-parties

Comprehensive

- Technical and behavioral actions and indicators

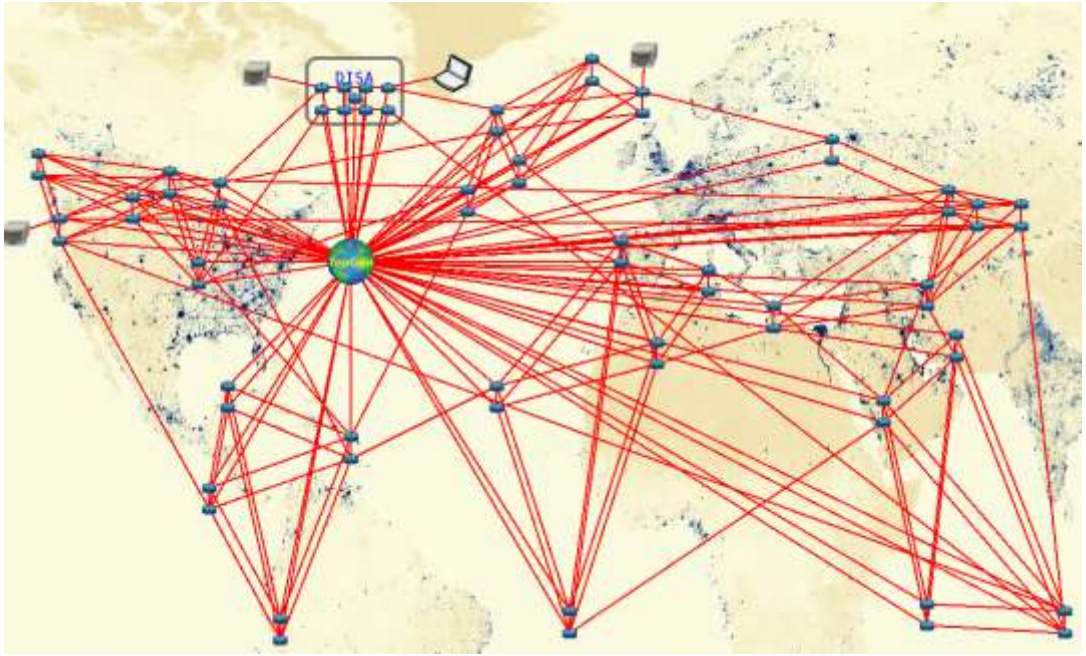
Reference Architecture

- Virtualized (VM) on-prem environment
  - 2x: 256GB, Dual 8 Core Xenon
  - 2TB storage
    - Linked VM Clones
- Amazon Web Services Proof of Concept
  - GovCloud – ITAR Compliance
  - 10 Service Systems (t3.nano – xlarge)
  - 5-10 Users (t3.small)
  - 4-8 hours/day
  - <$500/month



Open-Source/Freeware Infrastructure Tools

- Greybox/TopGen (Topology Generator) https://github.com/cmu-sei/topgen / https://github.com/cmu-sei/greybox
  - Isolated (Air-Gapped) Internet-in-a-box
- iRedMail https://www.iredmail.org/
  - Webmail simulation
- Owncloud Server https://owncloud.com/
  - Cloud storage simulation



Open-Source User Simulation Tools

- GHOSTS ((G)eneral HOSTS) Framework https://github.com/cmu-sei/GHOSTS
  - Non-player character (NPC) automation
  - Baseline traffic
- GHOSTS-Animator https://github.com/cmu-sei/GHOSTS-ANIMATOR
  - User detail generator
  - Addresses, Rank, Work Location, Potential Risk Indicators

https://insights.sei.cmu.edu/blog/generating-realistic-non-player-characters-for-training-cyberteams/

Infrastructure as Code (IaC)

```
module "dc" {
  source     = "./modules/dc"
  dc_instance_type  = var.dc_instance_type
  subnets    = var.subnets
  security_groups = var.security_groups
}
```

```
resource "aws_instance" "this" {
  ami                    = data.aws_ami.this.id
  instance_type          = var.dc_instance_type
  iam_instance_profile   = "FIN SSM Role"
  private_ip             = "10.0.40.20"
  subnet_id              = var.subnets
  vpc_security_group_ids = var.security_groups

  tags = {
    Terraform   = "true"
    Name        = "FIN-DC"
    Environment = "FIN Test"
  }
}
```

Open-Source Tools:

- Terraform https://www.terraform.io/
  - Infrastructure as Code
  - Multi-platform (Windows/Linux/OSX)
  - Multi-cloud (AWS/VMware/Azure)
- Packer https://www.packer.io/
  - Virtual machine image builder
- Ansible https://www.ansible.com/
  - System provisioning and configuration

What Next?

- Faster and more realistic baseline data generation
  - How ‘real’ is ‘real enough’ for certain test objectives?
- Variety and modularity of testing environment
- Automated test and evaluation

Q&A / Open Discussion

Presenter Contact Information

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