Forensics for Critical Information Infrastructure Protection

By

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Presented At

The Digital Forensic Research Conference

DFRWS 2004 USA Baltimore, MD (Aug 11th - 13th)

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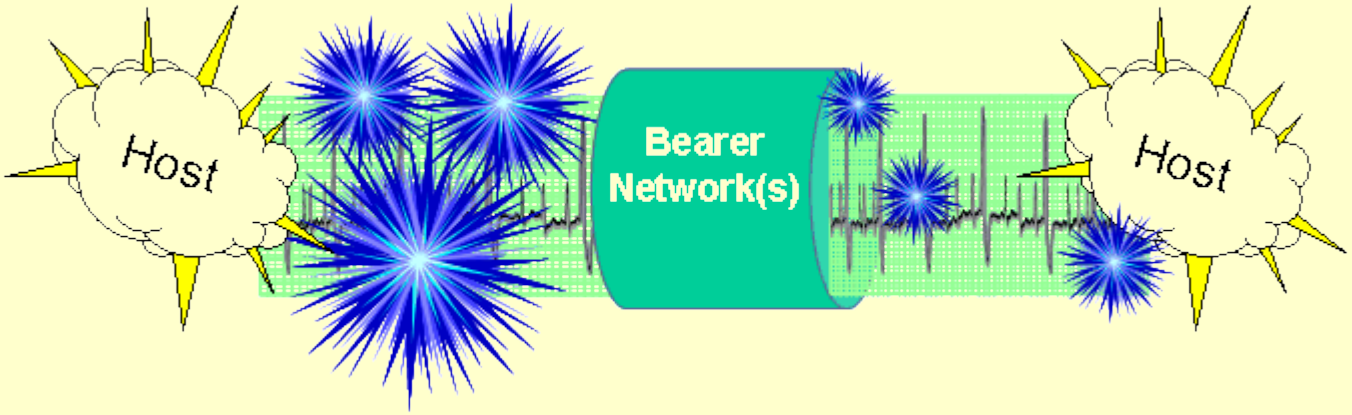
Forensics for Critical Information Infrastructure Protection (CIIP)



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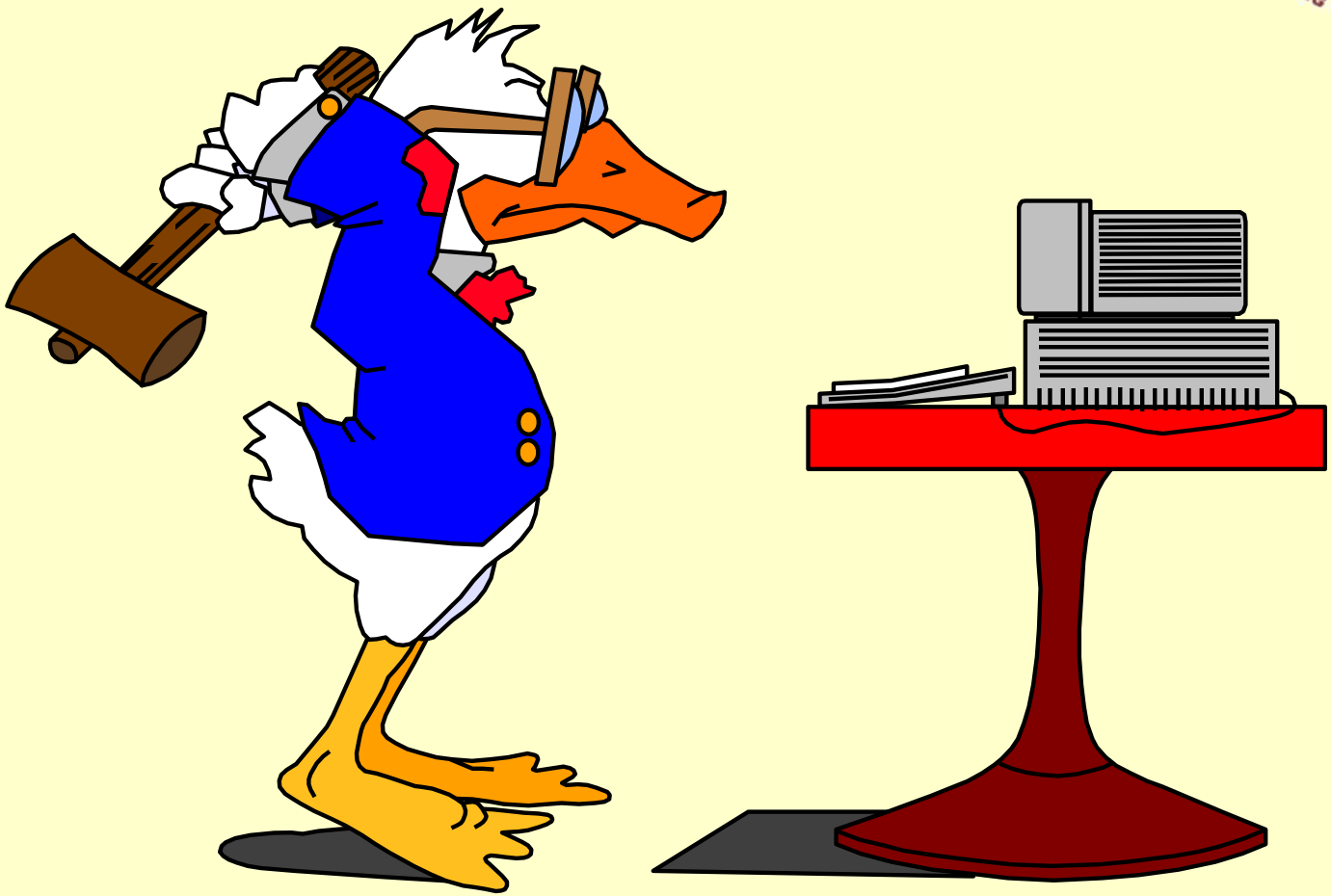
Forensics in CIIP

- **The CIIP Context**
- **Forensics and Triage**
- **Questions**

The CIIP Context



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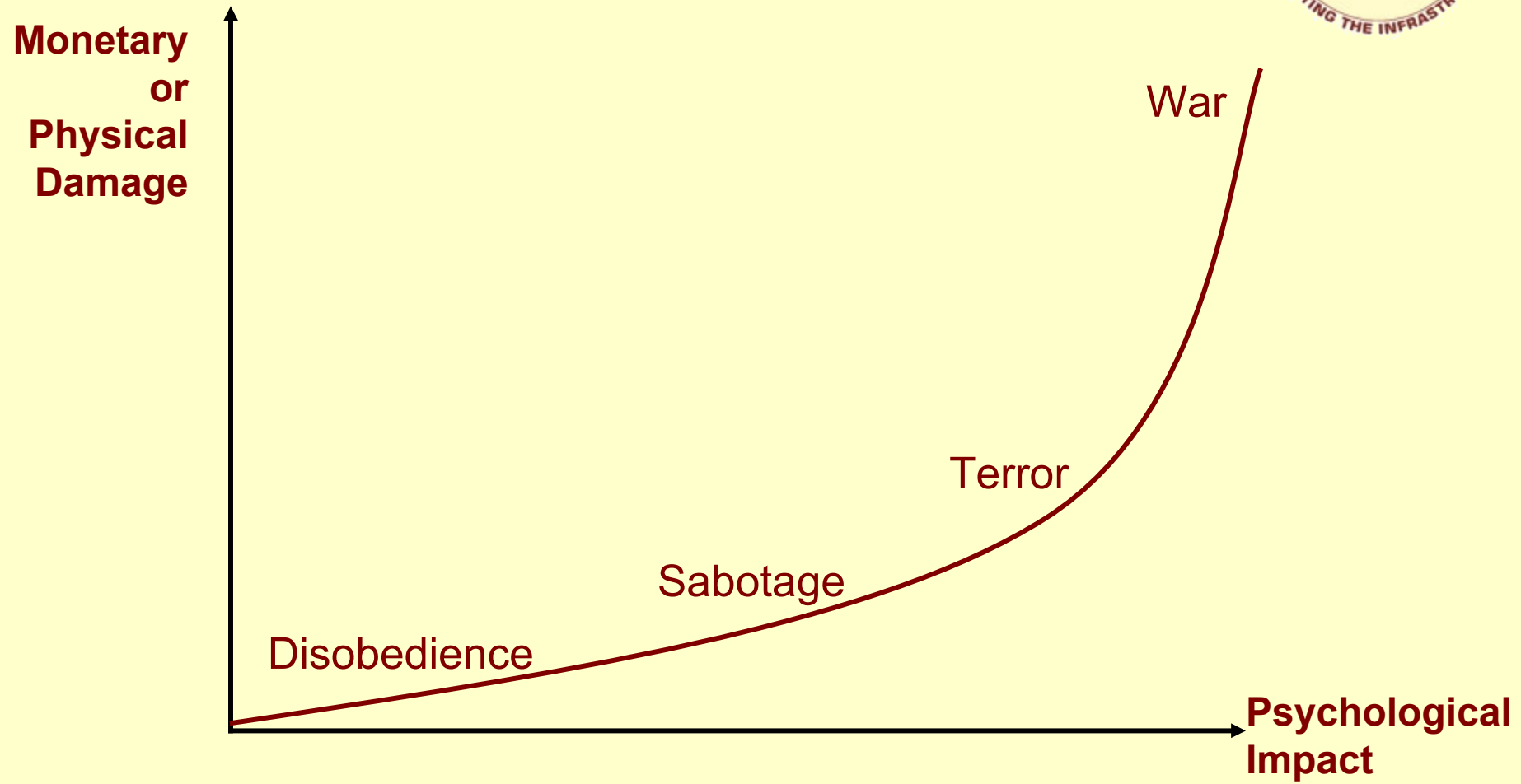
Cyber Attack

- **Selection of mechanisms**
  - **1st Order Cyber effects**
    - **MalWare (Collateral) ; DDOS (Directed)**
  - **2nd Order Cyber effects**
    - **Collateral Physical effects of Cyber acts**
    - **Cyber PsyOps e.g. Threats to HLS personnel**
  - **2nd / 3rd / nth Order Kinetic effects**
    - **Physical attack causing Cyber impact**

Threat Spectrum



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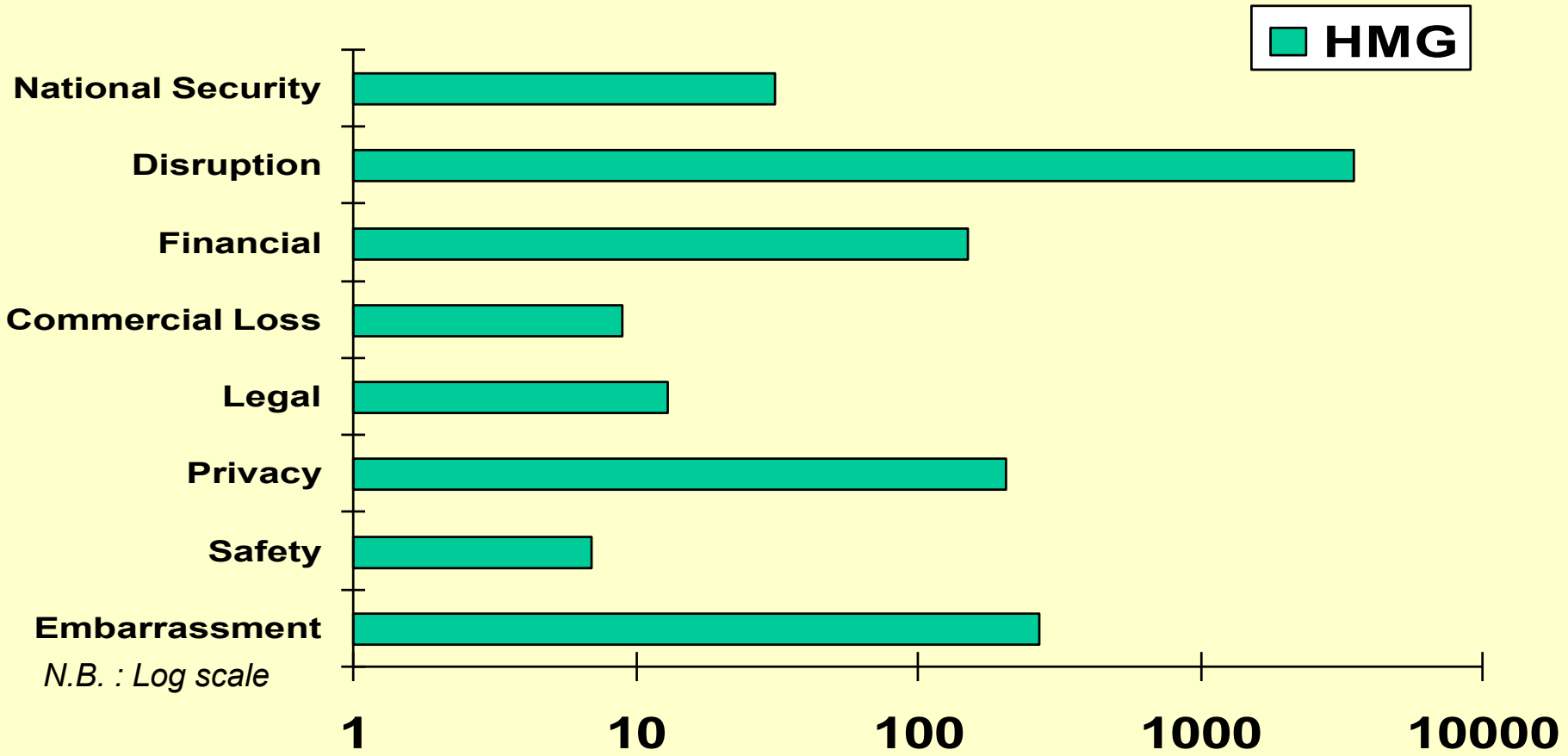
Incidents Reported to UNIRAS



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The Multipartite Problem

- **Variety of interested parties**
  - **Organisations detecting an Incident**
  - **Security Staffs**
  - **Law Enforcement**
  - **Technical Staffs**
  - **National CIIP organisations**
- **Dependencies**
  - **Avoiding actions of one party adversely impacting on others' interests**
  - **Biggest challenge is to prevent Evidential contamination during Detection / Triage**

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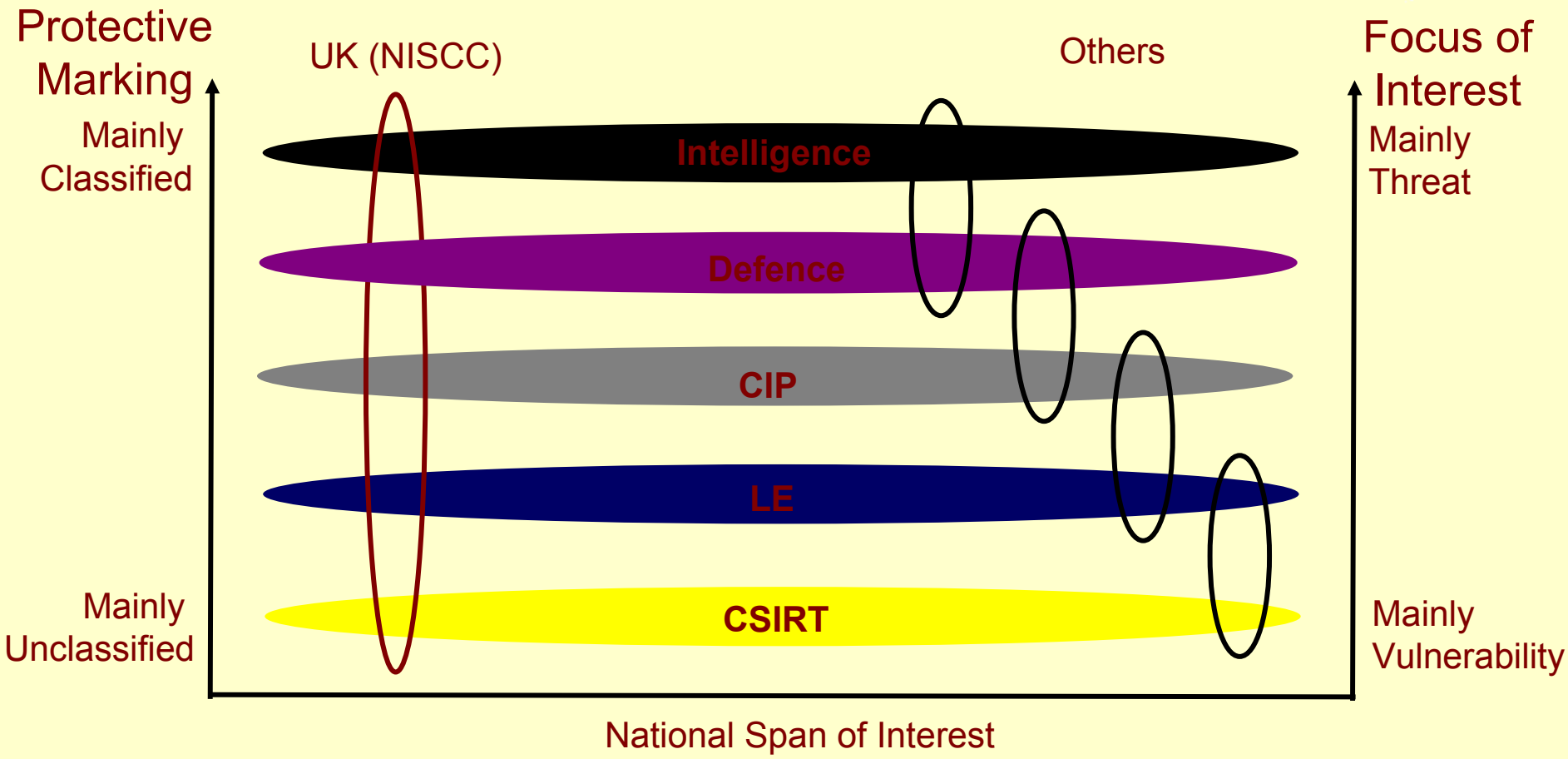
Communities of Interest



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Is this Forensics ?

Frequency	Ports
Very High	**21 (FTP),** 80 (HTTP)**, 111 (SunRPC), 139 (NetBIOS-SSN), 1433 (MS-SQL)**
High	**22 (ssh), 23 (telnet),** 25 (smtp)**, 53 (domain), 137 (NetBIOS-NS),** 443 (HTTP-S)**, 445 (MS-DS), 515 (lpdw0rm), 1080 (SOCKS), 1524 (Ingreslock), 3128 (Squid), 6112 (dtspc),** 8080 (HTTP-alt)**, 27374 (SubSeven)**
Medium	**3 (compressnet), 57 (privterm), 1024 (Jade), 1214 (Grokster), 1243 (Backdoor-G), 3072 (CSDmonitor), 3389 (MSTermSvc), 5800 (VNC), 6588 (AnalogX), 8000 (irdmi), 8888 (ddi-tcp-1)**
Low	**135 (epmap), 1434 (MS-SQL), 2049 (NFS), 4000 (BackBackDoor), 4001 (newoak), 4002 (pxc-spvr), 4003 (pxc-splr), 8081 (BlackIce)**
Very Low	**(All others)**

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Forensics and Triage

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Triage

(Tr-äzh, Träzh)

1. **A process for sorting injured people into groups based on their need for or likely benefit from immediate medical treatment.**

2. **A system used to allocate a scarce commodity**

3. **A process in which things are ranked in terms of importance or priority**

Incident Triage

Main Categories

- **Offensive Information Operations**
- **Serious Security Breach**
- **Serious Criminal Offence**
- **Other Electronic Attack**
- **Other Technical Incident**
- **Other Criminal Offence**
- **Other Security Incident**

Response Profile (1)

Type	**Offensive Information Operations**
Characteristics	**Malicious Electronic Attack (MEA)** • **HERF weapons** • **Denial of Service (DOS)** • **Targeted MalWare**
Threat Actor(s)	• **Hostile Power(s)** • **Empowered Small Agent(s)**
Lead	**National Government**
Forensics Requirement	• **2 phase : Rapid Assessment followed by Post Event Analysis** • **Evidential quality not usually paramount** • **Rapid restoration of service**
Remarks	**Typically Military response** ***(if permitted by Rules of Engagement (RoE))***

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Response Profile (2)

Type	**Serious Security Breach**
Characteristics	**Compromise of:** **• Highly Sensitive Information** **• Highly Critical Systems**
Threat Actor(s)	**• Hostile Intelligence Service(s)** **• Individuals**
Lead	**Security / Counter-Intelligence Staffs**
Forensics Requirement	**• 2 phase: Assessment, then Comprehensive Incident Analysis** **• Evidential quality will vary** **• Timely restoration of service**
Remarks	**Forensic requirement will vary with Attribution, as actions by Individuals may lead to a Prosecution**

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Response Profile (3)

Type	**Serious Criminal Offence**
Characteristics	**Typical categories** • **Theft** • **Misuse (obscene material)**
Threat Actor(s)	• **Individuals**
Lead	**Law Enforcement**
Forensics Requirement	• **1 phase: Comprehensive Incident Analysis** • **Evidential quality paramount** • **Timely restoration of service**
Remarks	**Police and Criminal Evidence Act, and ACPO Code of Practice, govern Evidential Requirements**

Response Profile (4)

Type	**Other Electronic Attack**
Characteristics	**Directed attack, or Collateral Attack with Major Impact :** **• DDOS** **• Defacement** **• MalWare with malicious payload**
Threat Actor(s)	**• Empowered Small Agent(s)** **• Individual(s)**
Lead	**CSIRTs ("CERTs")**
Forensics Requirement	**• 2 phase: Assessment, then Comprehensive Incident Analysis** **• Evidential quality will vary** **• Rapid restoration of service**
Remarks	**Forensic requirement will vary with Attribution, as if perpetrator can be identified, may lead to a Prosecution**

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Response Profile (5)

Type	**Other Technical Incidents**
Characteristics	**Typically "undirected", but of significant impact:** **• Intensive Scans and Probes** **• Spamming** **• MalWare without malicious payload**
Threat Actor(s)	**• Individual(s)**
Lead	**CSIRTs ("CERTs") or WARPs**
Forensics Requirement	**• Normally only Assessment required** **• Occasional need for Comprehensive Incident Analysis** **• Rapid restoration of service**
Remarks	**Forensic requirement will vary with both Novelty and Attribution:** **• If event is unique or unusual, Technical details of most interest** **• If clear perpetrator can be identified, may lead to a Prosecution**

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Response Profile (6)

Type	**Other Criminal Offence**
Characteristics	**Major categories** • **Misappropriation** • **Criminal Damage**
Threat Actor(s)	• **Individuals**
Lead	**Law Enforcement**
Forensics Requirement	• **1 phase: Comprehensive Incident Analysis** • **Evidential quality paramount** • **Timely restoration of service**
Remarks	**Police and Criminal Evidence Act, and ACPO Code of Practice, govern Evidential Requirements**

Response Profile (7)

Type	**Other Security Incident**
Characteristics	**Minor Impact** • **Misuse (excluding obscene material)** • **Failure to observe security regulations**
Threat Actor(s)	• **Individuals**
Lead	**Local Security Staffs**
Forensics Requirement	• **Not normally required** • **Minimal impact on service if invoked**
Remarks	**If Forensics required, will normally only be for limited Evidential quality for internal disciplinary concerns**

Summary

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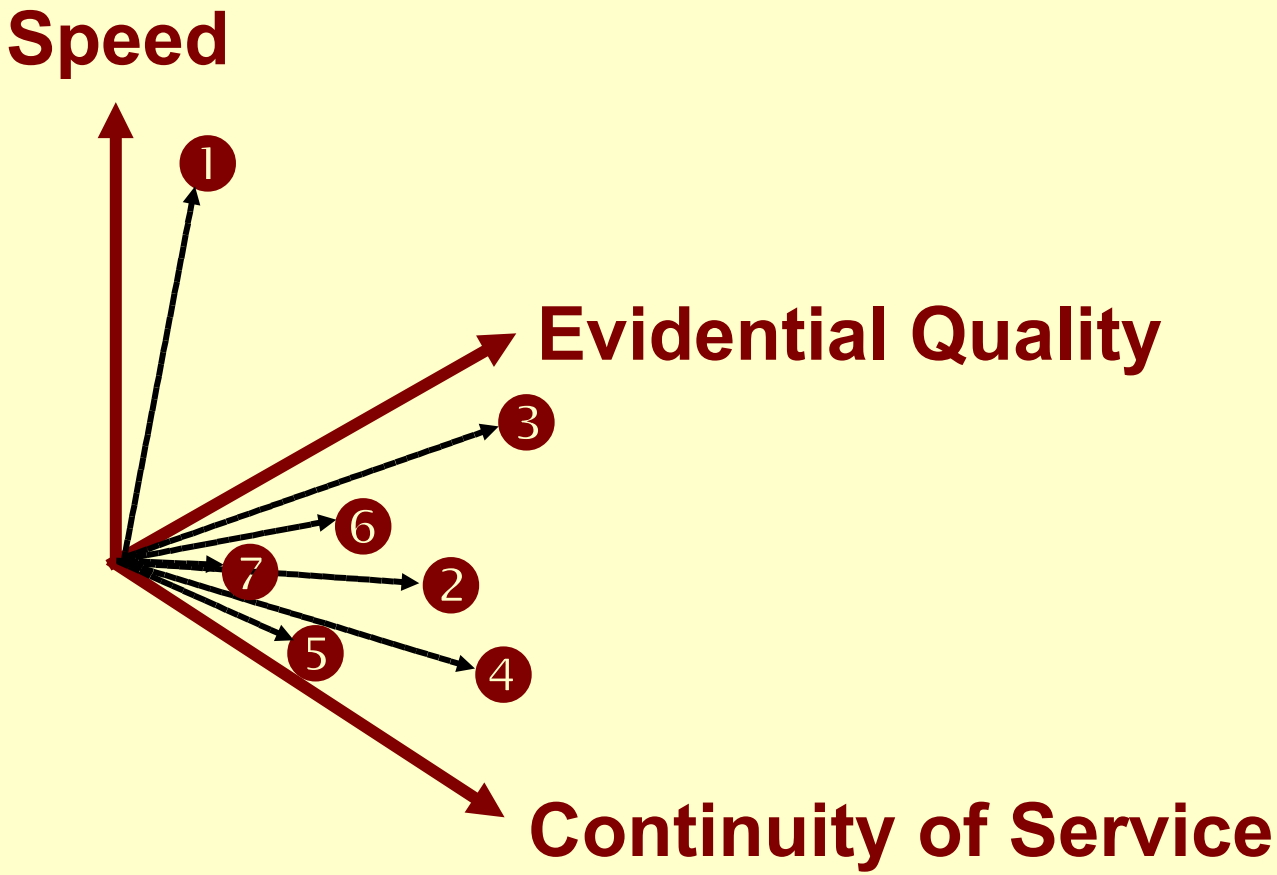
No "One Size Fits All" Solution



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Conclusions

- **Widespread need for Forensic services in Information Assurance**
- **A Triage process is essential to determine speed, scope, and purpose when Forensic involvement required**
- **Forensics activity must not become a Denial of Service (DOS) itself**
- **Biggest challenge to Forensics is outside the control of its own community :**
  - **Prevention of Evidential contamination during Detection / Triage**

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Questions ?

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