



**Cyber-Intelligence: For Threat-Profiling of  
Sub-State Actors in the Information Age**

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RAND Europe – Using Partnerships in Europe to Create  
Awareness in the Information Society



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- What is the CNI?
- What is terrorism? What is cyber-terrorism?
- Asymmetric Actors and Cyber-Threats
- Hype or reality? Security in the Information Age
- Terrorism in Cyber-Space: threats and TTOs
- Cyber-Threats: Evolution, Indicators & Warning
- Information Assurance & Critical Infrastructure Protection
- CIP Internationally: Essentials for Policy

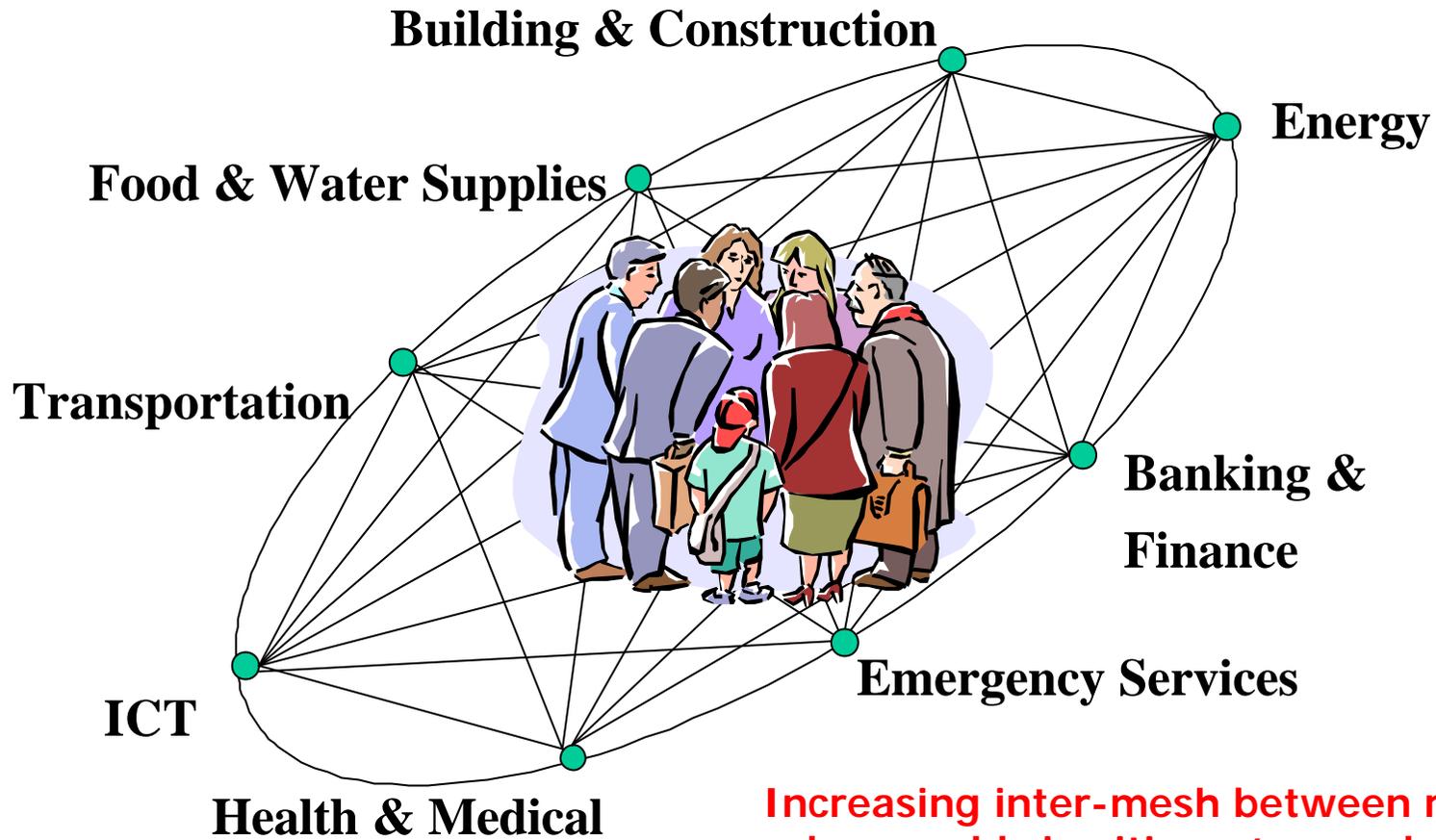
## The Critical National Infrastructure (CNI)

Those physical and information technology facilities, networks and assets whose disruption or destruction would have serious impact on the health, safety, security, economic well-being of citizens or on the effective functioning of governments and businesses



**See definition on terrorism later**

# The Critical National Infrastructure (CNI)



Increasing inter-mesh between real- and cyber-worlds in citizens' everyday lives

### Context

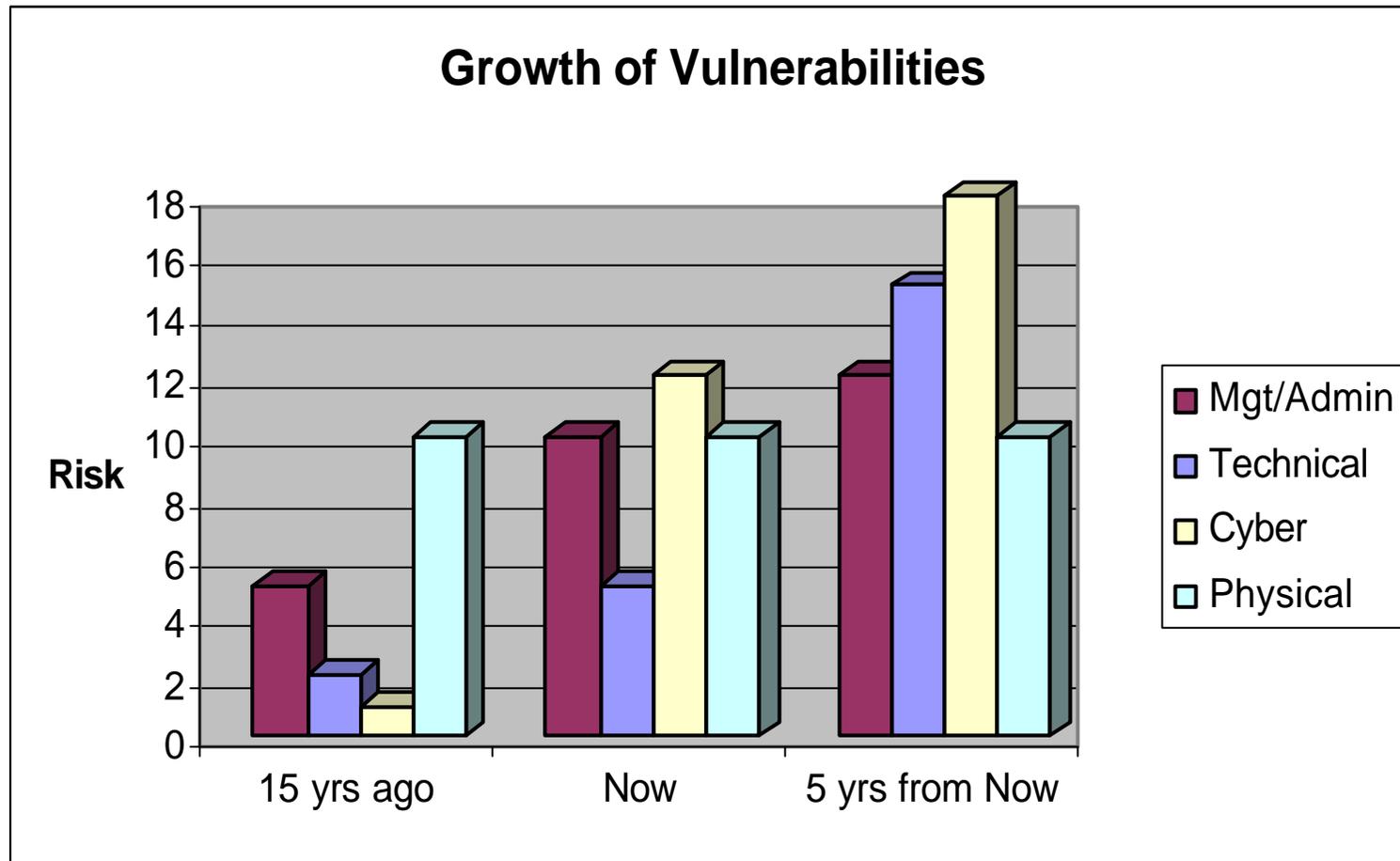
- Development of IT & Communications a critical component of globalisation
- E-Commerce, Evolution in Military Affairs, Business Efficiencies, Critical Infrastructures
- Rapid Growth translating into Dependence and Interdependence
- Sophistication and attendant Dependencies also source of vulnerabilities

- Globalised, interconnected world
  - Fashion, music, finance ... computer viruses
- In 20<sup>c</sup>, massive societal disruption required aerial bombardment, blockade
  - Now, can be undertaken by asymmetric opponents
- 11 September 2001, disruption was only a by-product...now...

- The problem is threefold
  - contemporary society is inherently more vulnerable to malicious attacks
  - terrorists use modern infrastructures to attack them
  - shocks to one infrastructure may cause ripple effects in others

- The means of possible attacks on our infrastructures are varied
  - include physical attacks, cyber-attacks, NBC attacks and psychological attacks (e.g. through market and media manipulation)
  - “old terrorism” – focusing on individuals as targets and using conventional weapons – has not been replaced by the new terrorism

- The transition to a more technology-intensive economy, demographic and societal change, and growing interdependencies look set to increase the vulnerabilities of major systems in the 21st Century
- The provision of health services, transport, energy, information and telecommunications, food and water supplies, safety and security are all examples of vital systems which can be severely damaged by a single catastrophic event, a chain of events, or the disastrous interaction of complex systems (OECD)



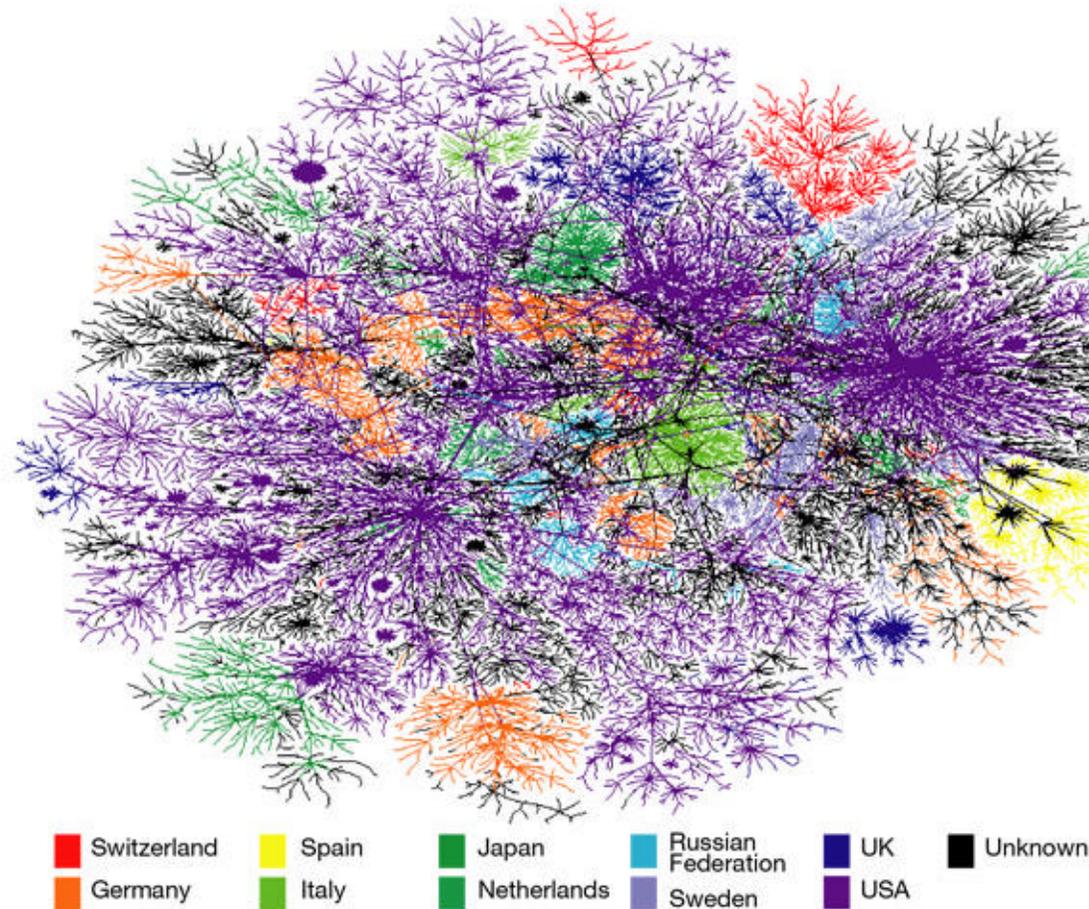
- Redirecting terrorist violence away from humans to infrastructures
  - 1990s: IRA use this concept very effectively, sufficiently occupying the resources of the British government through infrastructural attacks (as opposed to direct attacks against people)
  - In the future, stock markets or other primary financial institutions might become high-profile targets and the most effective means of accomplishing a terrorist's goal
  - More damage would be accomplished by taking the New York Stock Exchange offline for a few days rather than actually bombing a building

Danger of increasing moves towards Nuclear,  
Biological, Radiological, Chemical attacks – forgets...

Increasing  
propensity towards  
*Infrastructural*  
*Attacks*



## The Vulnerable Internet?



The unlawful use of – or threatened use of – force or violence against individuals or property to coerce or intimidate governments or societies, often to achieve political, religious, or ideological objectives

(US Dept. of Defense)

Terrorism is the “**use or threat of action** [which]:

- involves **serious violence against a person**;
- involves **serious damage to property**;
- **endangers a person's life**, other than that of the person committing the action;
- **creates a serious risk to the health or safety** of the public or a section of the public; or
- is designed seriously to interfere with or seriously to disrupt an **electronic system** [– and]
- the use or threat is designed to **influence the government** or to **intimidate the public** or a section of the public; and the use or threat is made for the purpose of **advancing** a political, religious or ideological cause (UK *Terrorism Act 2000*)

- **Large Transition States:** transoceanic nuclear delivery capabilities, substantial technological & military-industrial development bases, large regional military capacities, and substantial space programmes with access to much of the global aerospace industry through commercial sources – **China, Russia, and India**
- **Rogue States:** most of these – **Syria and Libya** particularly, with **Iran, North Korea and Indonesia** slowly beginning to come alongside – have warmed their relations with the Advanced Nations; however, in other states, autocrats who cling to power (such as **Zimbabwe or Burma**) confront the international community in a variety of ways

- **Failed States:** with the widening gap between the Developed and Developing Worlds, and the illegitimacy of rule by warlords and despots, rival factions often vie for supremacy within these states – with the patronage of organised crime, trafficking in weapons, narcotics, stolen goods and human beings – **Liberia & Jamaica**
- **Transnational Organised Criminality:** as organised crime begins to take advantage of the Information Age, it has become both much more sophisticated & transnational, existing anywhere in the world through both the use of technology and increasing globalisation – becoming involved in conflicts in a manner similar to a rogue actor or terrorist

- Transnational Terrorism (including extremist religious, anarchist, or patriotic forces): during the 1990s, international terrorism gave way to transnational terrorism. While many of the international terrorist organisations that existed over the previous two decades have made the transnational migration, others large groups have come to the fore, including Islamic fundamentalist factions – many of which are linked to al-Qaeda
  1. political borders are irrelevant to the group's objectives – they do not act on behalf of any particular state
  2. membership and resources are drawn from supporters in more than one state
  3. area-of-operations, including targeting, transcends state borders

What makes the "new" terrorism different?

1. We have lost/misplaced our understanding of COIN/CRW
  - World-wide insurgency/revolutionary strategy
2. Central message of COIN/CRW?
  - 80% political --- 20% military
  - Implications tactically & strategically
  - Lessons from McCuen, Thompson, etc
  - Lessons from past COIN/CRW

What makes the "new" terrorism different?

3. Differences between issue-based terrorism (ie. 1970s & 1980s) and revenge-based terrorism (ie. 1990s, especially Islamist fundamentalism)
4. Al-Qaeda is not interested in:
  - Negotiating
  - Discussing
  - Resolution
5. Solutions?

- **Rogue States, Transnational Organised Crime (TOC), & Transnational Terrorist Organisations (TTOs) now making the migration to cyberspace**

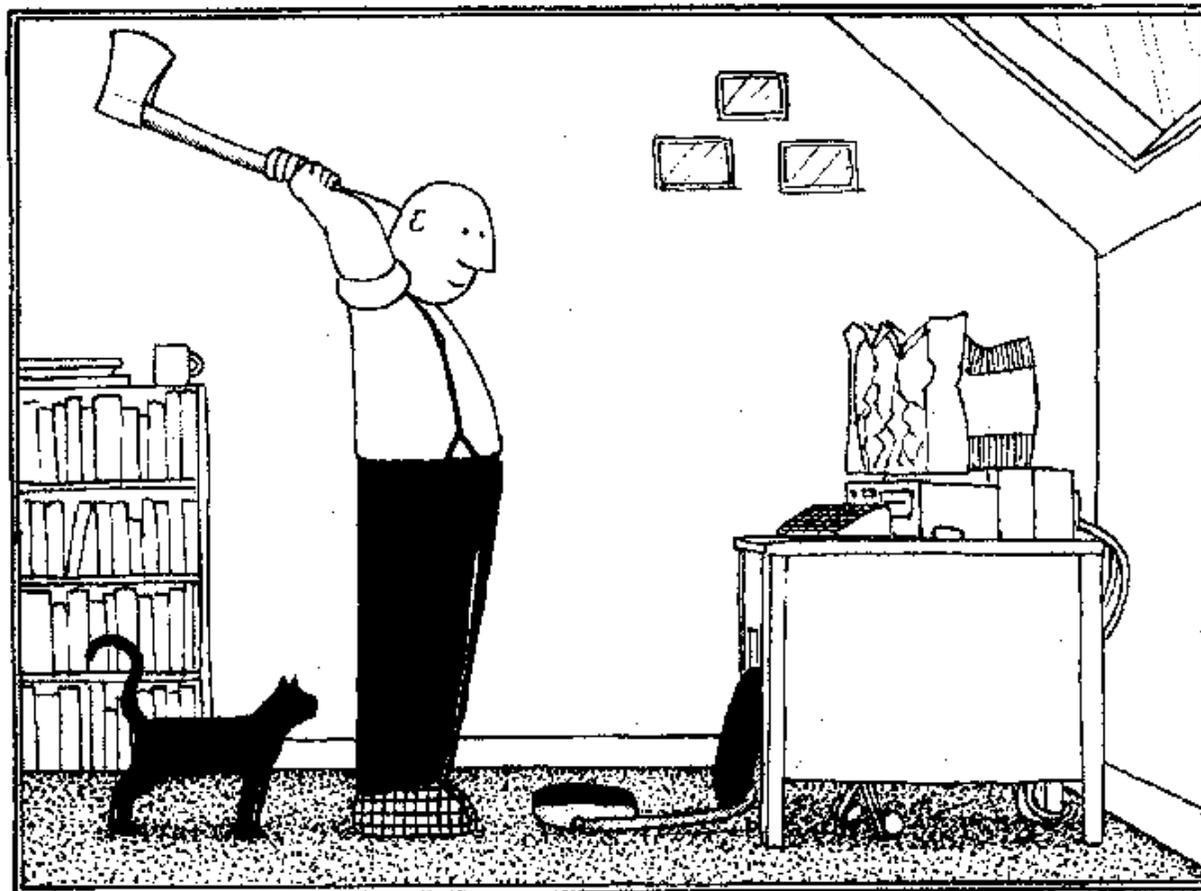
"Cyber-Terrorism" in criminal statutes on terrorism:

- designed seriously to interfere with or seriously to disrupt an electronic system (UK *Terrorism Act* 2000)
- In warfare as well as in business, IT is the great equaliser: its low financial barrier to entry relative to heavy industry allows even the poorest organisations an IT effectiveness equal (or nearly equal) to large corporations

"Cyber-terrorism" vs. "cyber-crime"

- **Cyber-crime:** real-world traditional criminal activities carried-out using computers, networks and other hi-tech means (ie. fraud, paedophilia)
- **Cyber-terrorism:** malicious activities carried-out against networks, networked systems and the Internet
- ↳ **Hacking and viruses, Cyber-terrorism, Spoof websites, Virtual countries, Distributed denial-of-service attacks**
- Legislation does not differentiate but can contradict (ie. *Computer Misuse Act 1992* [as amended 2002] vs. *Terrorism Act 2000* – "hi-tech crime" vs. "cyber-terrorism")

## Destruction of Information Networks & Systems



## Actual nature of the threat

- Is this "terrorism"??
  - Do cyber-attacks cause (mass) casualties?
  - Does it "terrorise"? Propaganda factor: "to be seen"
  - Certainly "(organised) political violence"

CRIME      TERRORISM      WAR

- Danger not from "electronic Pearl Harbour" but from "electronic Exxon Valdez" or "electronic Bhopal"

Hype or Reality?

## New Concepts of Security

### Cyber

**Risk & Vulnerabilities**

**Critical National  
(Information) Infrastructure**

**Attack & Early Warning**

**Brand**

**4 levels of threat**

### Real

**Security Intelligence loss**

**National security & well-  
being**

**Attack warning**

**Prestige**

**Multi-levels**

Quantifying & Valuing the Threat

### Cyber-Threats

- Cyber-terrorism is not only about damaging systems but also about intelligence gathering
- Intense focus on 'shut-down' scenarios and tight analogies with physically-violent techniques ignore other more potentially effective uses of IT in terrorist warfare: intelligence-gathering, counter-intelligence and disinformation
  - ↳ For example, attacking an information system would be a good way to either distract the target or otherwise enable the terrorist to perform a physical attack

### Transnational Terrorist Organisations in Cyber-space

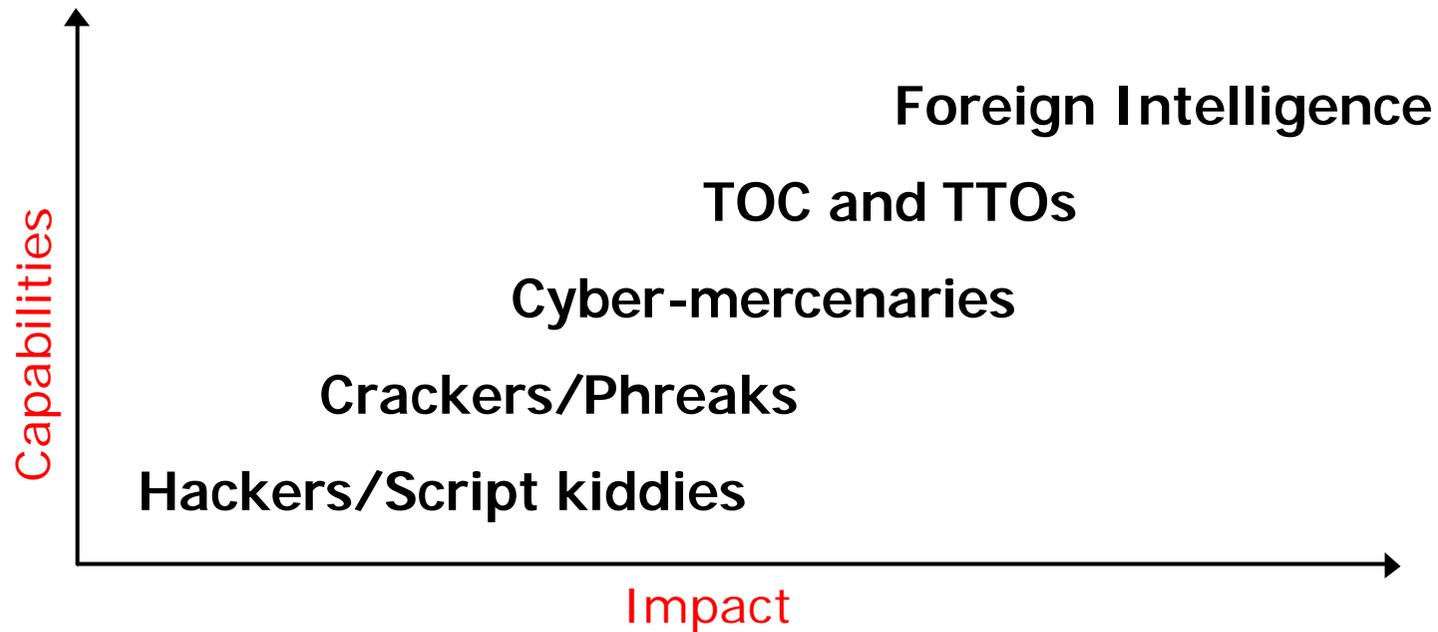
- use of new/Internet-based technologies for coordinating, communicating and supporting the planning of terrorist (cyber-based and real-world) activities
- “Virtual sanctuaries”
- Emigration: LTTE & SNLA cyber-attacks
- al-Qaeda & Cyber-space
- Aum Shinriyko & Tokyo Subway Attack

### Terrorists Using Cyber-space & New Technologies

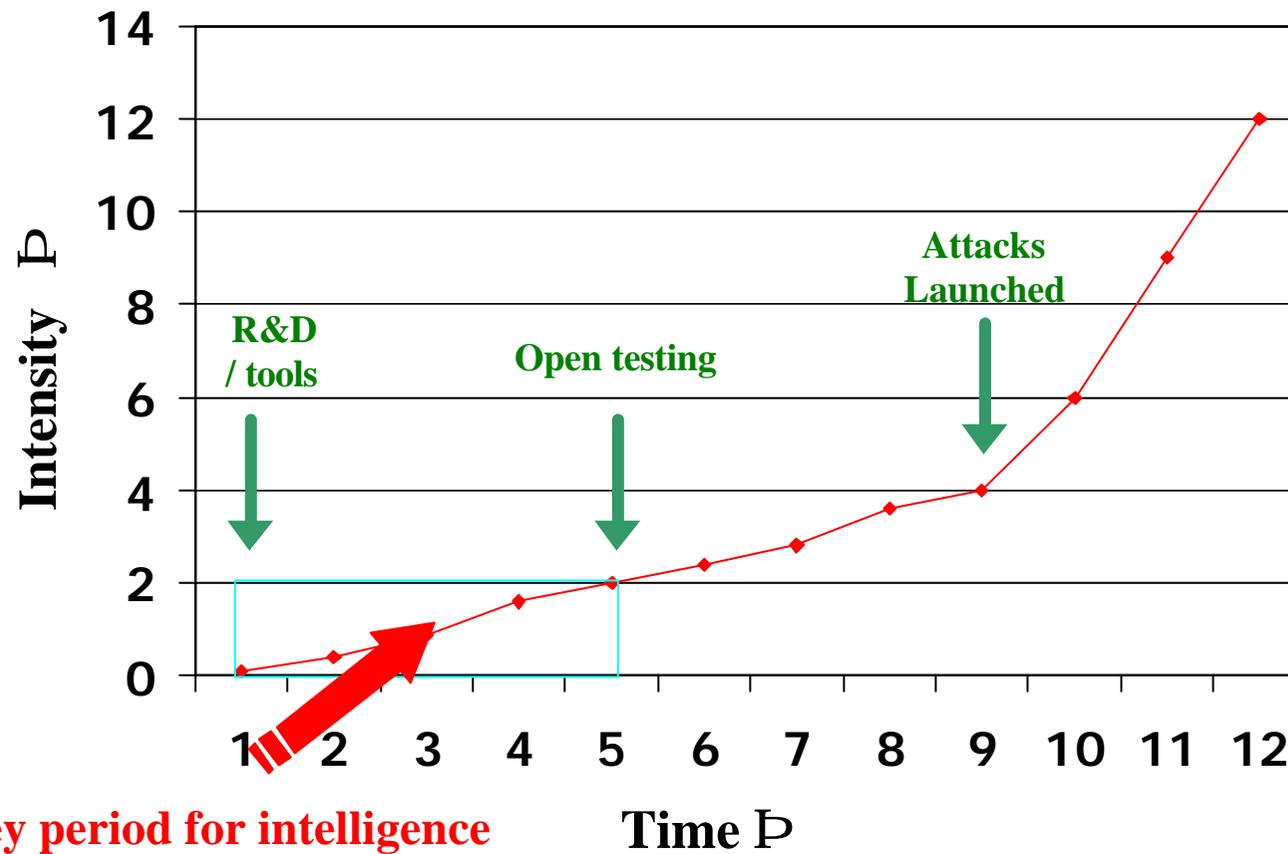
- The threat from cyber-terrorism as well as the significant use of cyber-space continues to grow exponentially
- “The advent of new technologies, advanced means of communication and ever-more sophisticated ways of moving money around have already influenced the way terrorists operate and will continue to do so. Terrorist organisers and fundraisers no longer have to be in the same country as their target or indeed as each other. Their communications to each other can be encrypted. And there is the potential, if the right targets are hit (such as strategic computer systems running banking or air traffic control operations), to affect thousands or even millions of people.” (UK Home Secretary 1998)

## Evolution of the threat – Tracking

- 5 levels of threat



## Evolution of the threat – Tracking



**Key period for intelligence  
detection & deterrence!!**

## Evolution of the threat – Indicators & Warning

- Governments face a challenge in developing risk management strategies in response to vulnerabilities in society's critical and information infrastructures – and threats that range from the nuisance to the catastrophic
- Analysing the threat is normally key to risk management and to designing management strategies
- Problem is in adapting these mechanisms to the new risk environment
- Because of the difficulty of understanding cyber-threats, most focus has been upon vulnerability-based and impact reduction strategies that concentrate on identifying and mitigating societal vulnerabilities

### Evolution of the threat – Indicators & Warning

- The current information systems security paradigm is a reactive model that involves detection of – and reaction to – attacks once they are underway
  - There is a pressing end-user need to increase warning time so that organisations can take preventive steps to minimise their losses from cyber-attacks
  - Require methodologies for predicting cyber-attacks, based on understanding, and thereby predicting, the activities of sub-state actors
- ⇒ Devise and test pre-attack indicators and threat profiles in order to increase warning time

- European states with extensive experience of terrorism (such as the UK and Spain) have designed and operated elaborate threat assessment mechanisms that have worked well in ensuring graduated responses to terrorist threats
- These mechanisms have also had some success in relation to lesser threats such as organised crime

- Need to develop Predictive Indicator summaries focused upon the problem of defining, categorising and correlating indicators of potential computer network attack by looking outward at the threat spectrum as well as inward at the pattern of incidents
- This approach allows the warning mechanism to focus upon motives and intentions of potential attackers, in addition to capabilities

- Need to develop an understanding of how new threats can be used to craft coercive policies to affect the behaviour of these actors
  - Includes the use of criminological and coercive literature to match potential threat actors with potential policies
- An initial characterisation of these policies is
  - Denial; Detection/Apprehension; Punishment; Pre-emption

### Information Assurance is:

- Information operations that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. This includes providing for restoration of information systems by incorporating protection, detection, and reaction capabilities (US DoD)
- Stakeholders
  - **Government**
  - **private sector**
  - **research community**

### Critical Infrastructures are:

- systems whose incapacity or destruction would have a debilitating impact on the defense or economic security of the nation (US PDD-63)
- Essential focus on Critical National Infrastructure (CNI) & Critical National Information Infrastructure (CNII)
  - Including concern with International Information Infrastructures (III)
- Currently (post-9/11) entwined with Homeland Security approach in US, UK and elsewhere

## Critical Infrastructure Protection evolving nationally

- Australia (NOIE, E-Security/CIP Committees, ABGCITF)
- UK (NISCC, DTi Security-At-Work, CCS, OEE, IAAC)
- US (CIAO, NIPC/Infragard, ISACs, PCIS, NCSA, PCIPB)
- Canada (OCIPEP)
- Other countries

## Critical Infrastructure Protection Policy Options

1. Identifying at an early stage efforts for co-ordinated action
2. Ensuring that a government body is assigned the central & lead responsibility as a government action-point
3. Creating points-of-presence to deal with cyber-space issues (ie. national & institutional computer emergence response teams (CERTs) & proposed national CIP plans)
4. Integrating public-private co-operation and co-ordination which ensures an integrated and co-ordinated response to threats and risks, as well as an open and on-going dialogue between industry and policy-makers

## Critical Infrastructure Protection evolving internationally

- *Bilateral ties & International alliances* in the fields of security and intelligence, building on long-standing intelligence and military relationships between the USA, UK, Canada and Australia (ie. **NOIE = CIAO/NIPC = NISCC = OCYPEP**)
- Public-Private Partnerships: across these countries, as well as others (ie. Germany, Sweden, Switzerland, Netherlands), the development of public-private approaches to CIP is evolving rapidly (ie. **NOIE/ABGCITF = PCIS = IAAC**)

## Critical Infrastructure Protection evolving internationally

- *Standards*: within the domain of IA&S and CIP policies and techniques, the gradual emergence of standards & common approaches is being encouraged (ie. **Common Criteria, Council of Europe Cyber-Crime Convention**)
- *Multilateral Co-operation*: ongoing initiatives in multilateral fora that touch on CIP and protection of the national information infrastructure are aimed at providing dependable infrastructures to enable the *delivery of electronic goods and services* to citizens (ie. **Council of Europe, OECD, G-8 (Lyon Group), UN, WTO, ITU, FATF**)

- ultimate aim being to develop new intelligence collection and operational methodologies to develop better threat profiles for indicators and warning of potential cyber-attack
- differentiating between attacks which use cyber-space as a conduit AND attacks on cyber-space itself

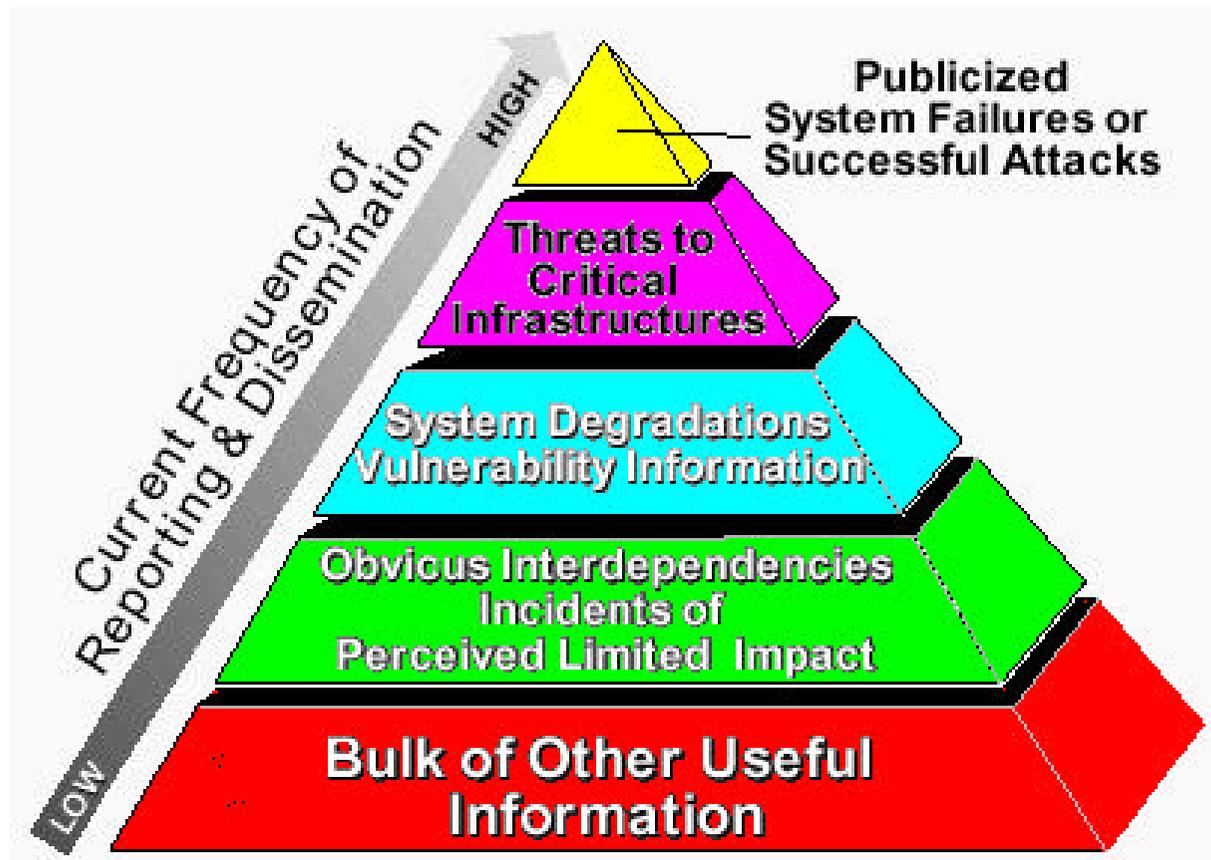
## "Cyber-intelligence"?

- Q: how should intelligence be perceived, used, etc in relation to cyber-space?
  - **do traditional methodologies, norms and operational rules apply?**
- should cyber-space (for lack of a better term) be seen as another fully-developed operational environment much as the streets of Berlin are? **YES**
- how does one conduct "operations" in cyber-space?  
are clandestine/covert actions applicable? if so, how?

- Issues to be considered
  - use of new/Internet-based technologies for coordinating, communicating and supporting the planning of terrorist (cyber-based and real-world) activities
  - 'net camouflage' and anonymisers
  - the applicability of counter-intelligence practices to cyber-based information operations (including computer network operations)
  - the aspects of threat- and actor-profiling outlined above

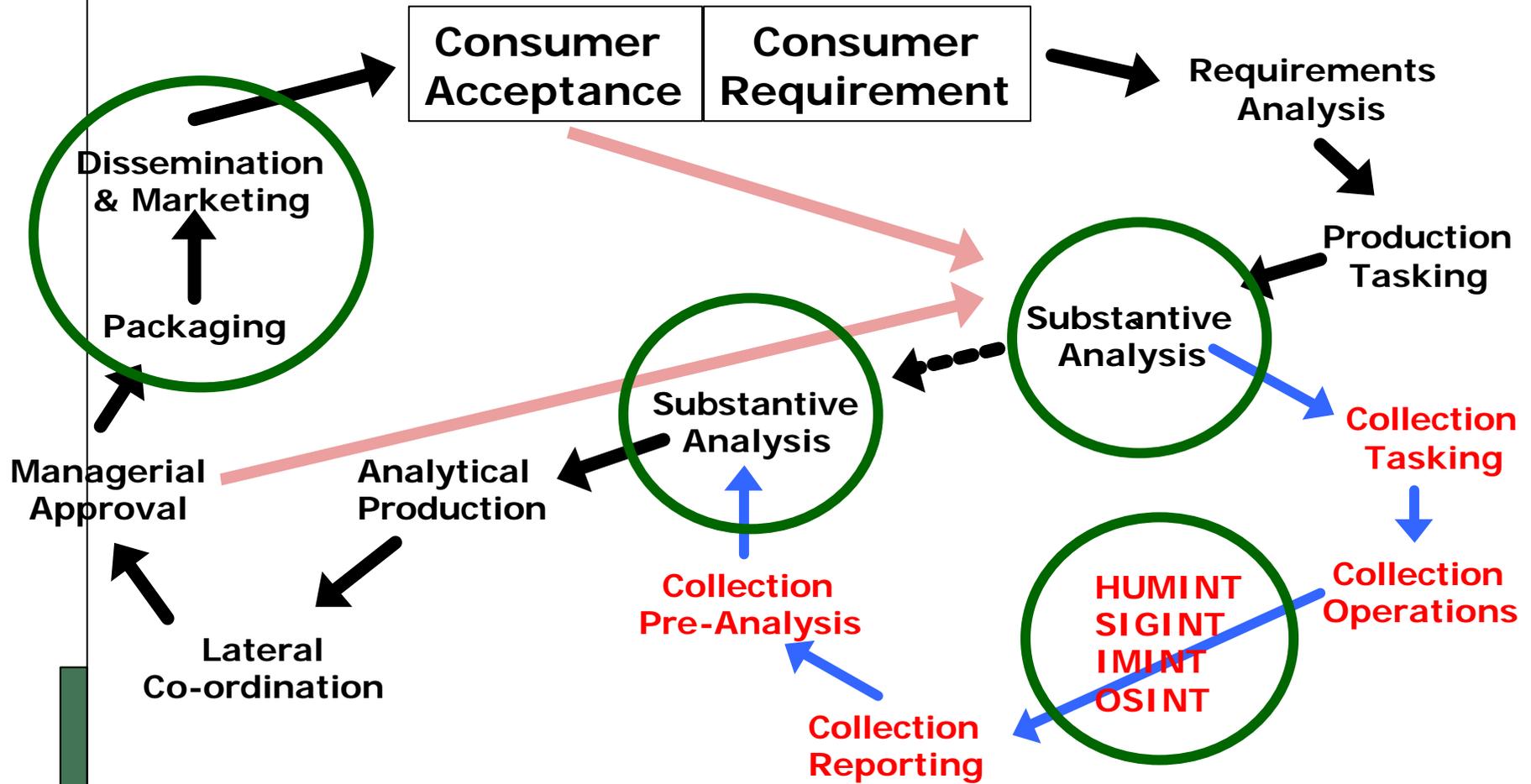
- Issues to be considered
  - Data mining/data dumping - search engines (Google primary)
  - Knowledge Management parameters
  - Time value of info & info-superiority
  - How to "kill/eliminate" actor? Can you?
  - Pursuit" in cyber-space considerations (legislation, security, borderless, ID switching, etc)
  - Legislation overall
- ✍ Overwhelming problem of OTT collection capabilities vs. bare-bone analysis capabilities

- Issues to be considered

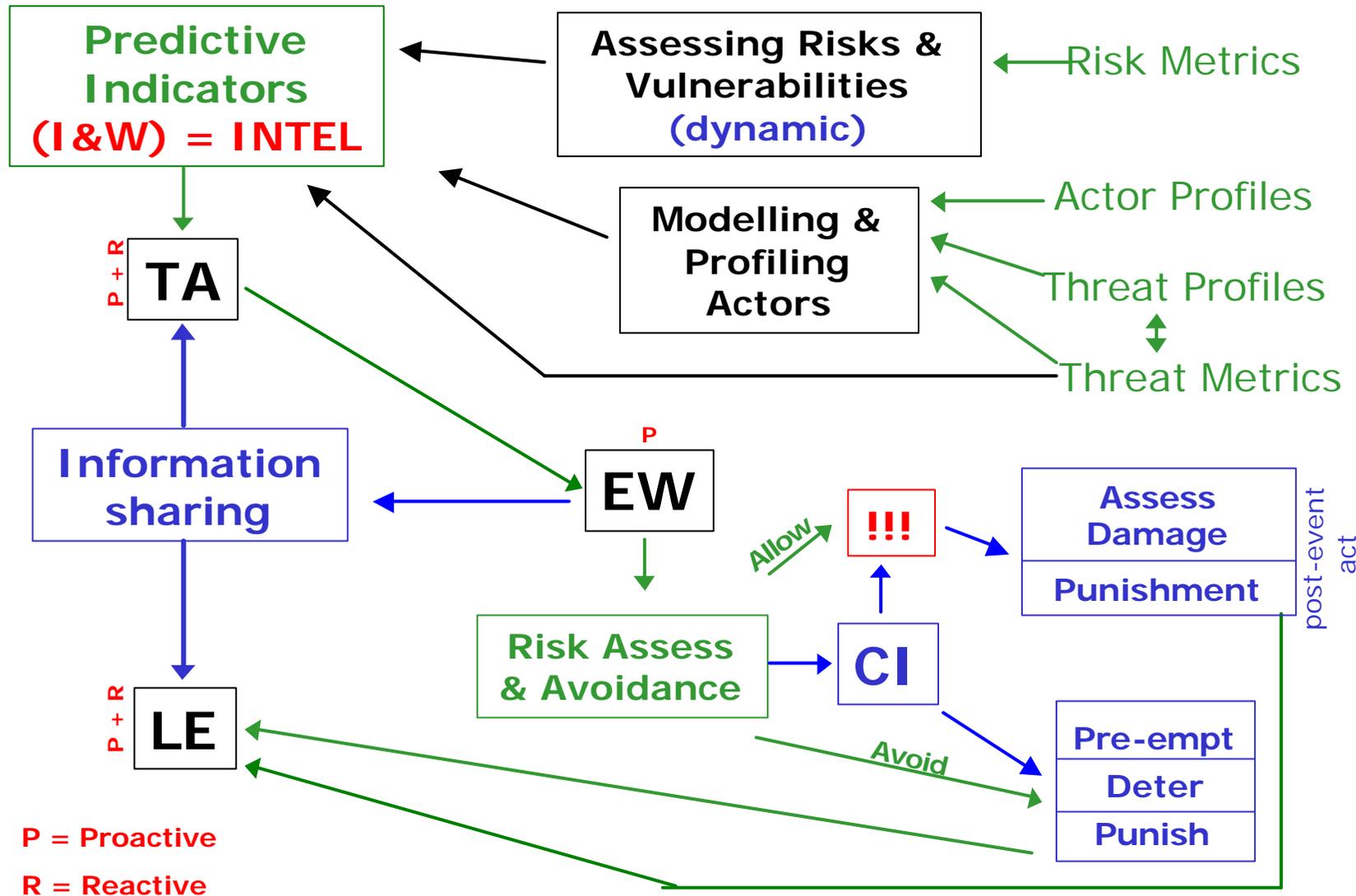


- Law Enforcement Intelligence:
  - Intelligence-led policing is the LE community's response to the information revolution and to rising demands on limited resources
  - information technologies and KM tools enable more efficient utilisation of resources
  - aim is for smarter, more effective policing and improved allocation of policing resources
  - ultimate goal is deterrence, prevention and detection of crimes

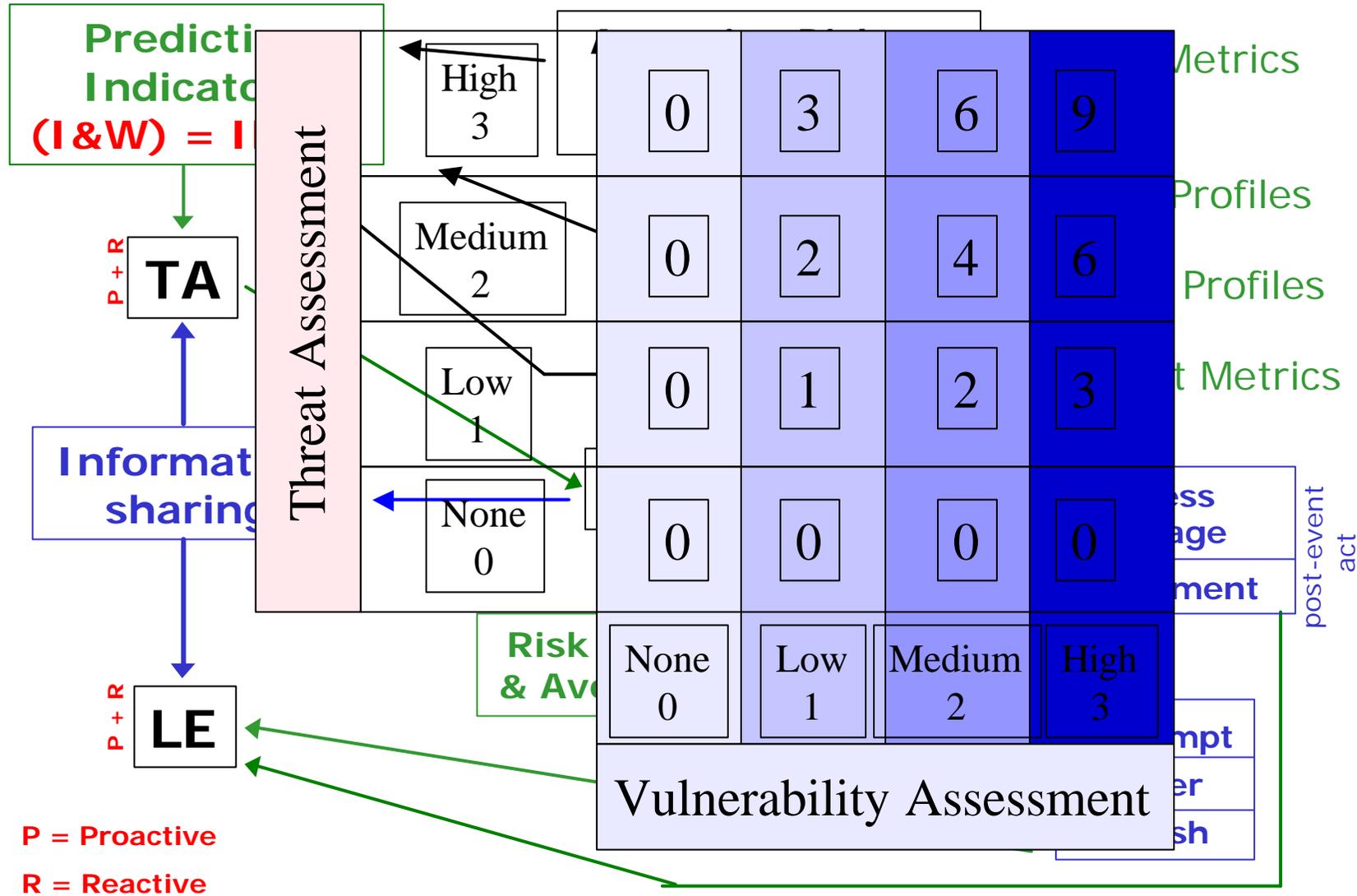
# Traditional Intelligence Cycle



# Cyber-Intelligence Cycle?



# Cyber-Intelligence Cycle?



# Cyber-Based Actor-Profiling

Net-camouflage

Anonymity

Who Is?

CND

Anti-Fraud

HR

Marketing

CI/BI

Library Sciences

Military IO/CNO

## Intelligence for CIP & Cyber-Threats

- Treat cyber-space as an operational environment
- Information-sharing is central: inter-agency, intra-governmentally, and internationally
  - **This is especially the based between law enforcement agencies and national security & intelligence agencies – this is a big failure right now on all levels**
  - **Essential to break-down traditional barriers and reluctance**
  - **Leads to better early warning**
- Enhance assessment to match collection efforts, which currently outweigh exponentially assessment and analysis resources

## Intelligence for CIP & Cyber-Threats

- Enhance socio-cultural intelligence collection to better understand the sea in which these field swim
- Enhance HUMINT in these regions, including distasteful but necessary interaction with sub-state criminal, despotic and even terrorist elements closer to the target
- Public-private partnerships in information-sharing and intelligence are key (aforementioned emphasis on importance of business and industry in this area)
- clearly designate a lead agency in each country to lead these efforts: the current protectionist attitude of agencies vis-à-vis each other (so-called 'turf wars') are extremely counter-productive and can only contribute to the opponents' success

- Must differentiate between cyber-crime and other cyber-based threats
- Must ensure co-operation and co-ordination between the private sector and government
- Must ensure co-operation and co-ordination internationally as well as nationally
- Must approach cyber-threats differently from real-world threats – and all this means for intelligence operations and methodologies
- Must look for ways to enhance early-warning by developing effective predictive indicators

Thank you!!

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