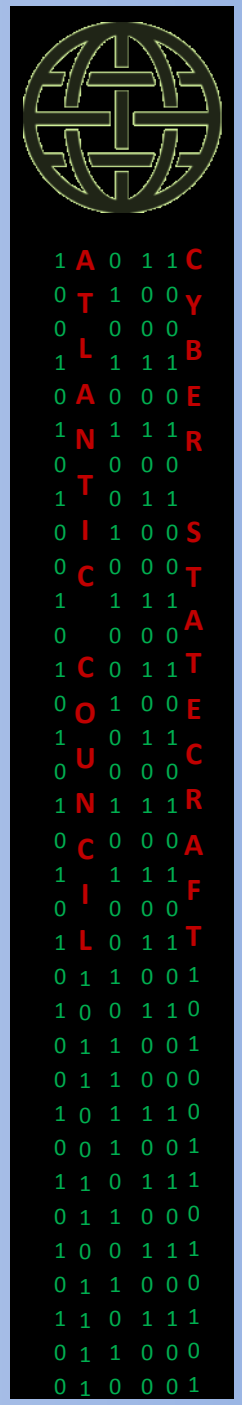
# Global Aggregation of Cyber Risks:

## *"Finding Cyber Sub-Prime"*

## 2nd International Conference on Cyber-crisis Cooperation and Exercises

**23-24 September 2013 | Athens, Greece**

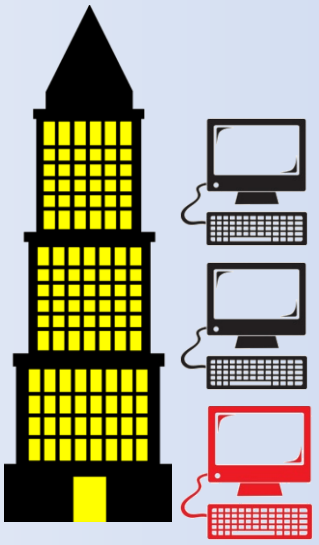


# Traditional Cyber Threats

"Cyber" just means interconnected IT, but that increasingly means *everything*

**Common Terms:**

- Intrusion, hack
- Cybercrime
- Carders
- Russia, East Europe
- Stolen identity, credit cards, records
- Extortion



Corporation X

Internet

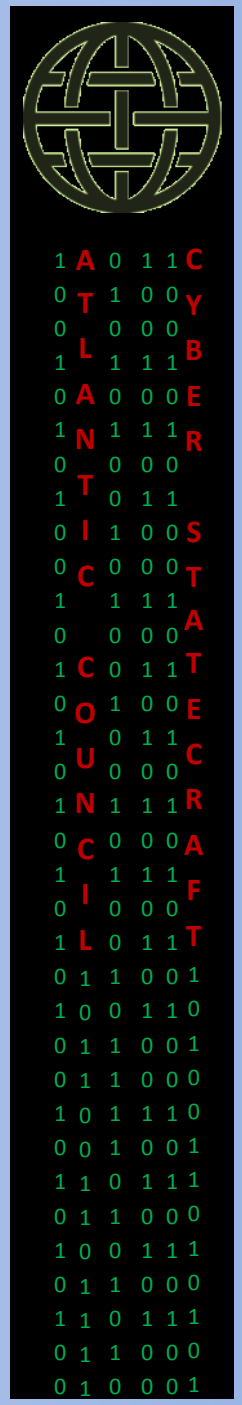
*Steal individual records with personal info to sell*

**Criminals**

Hactivists

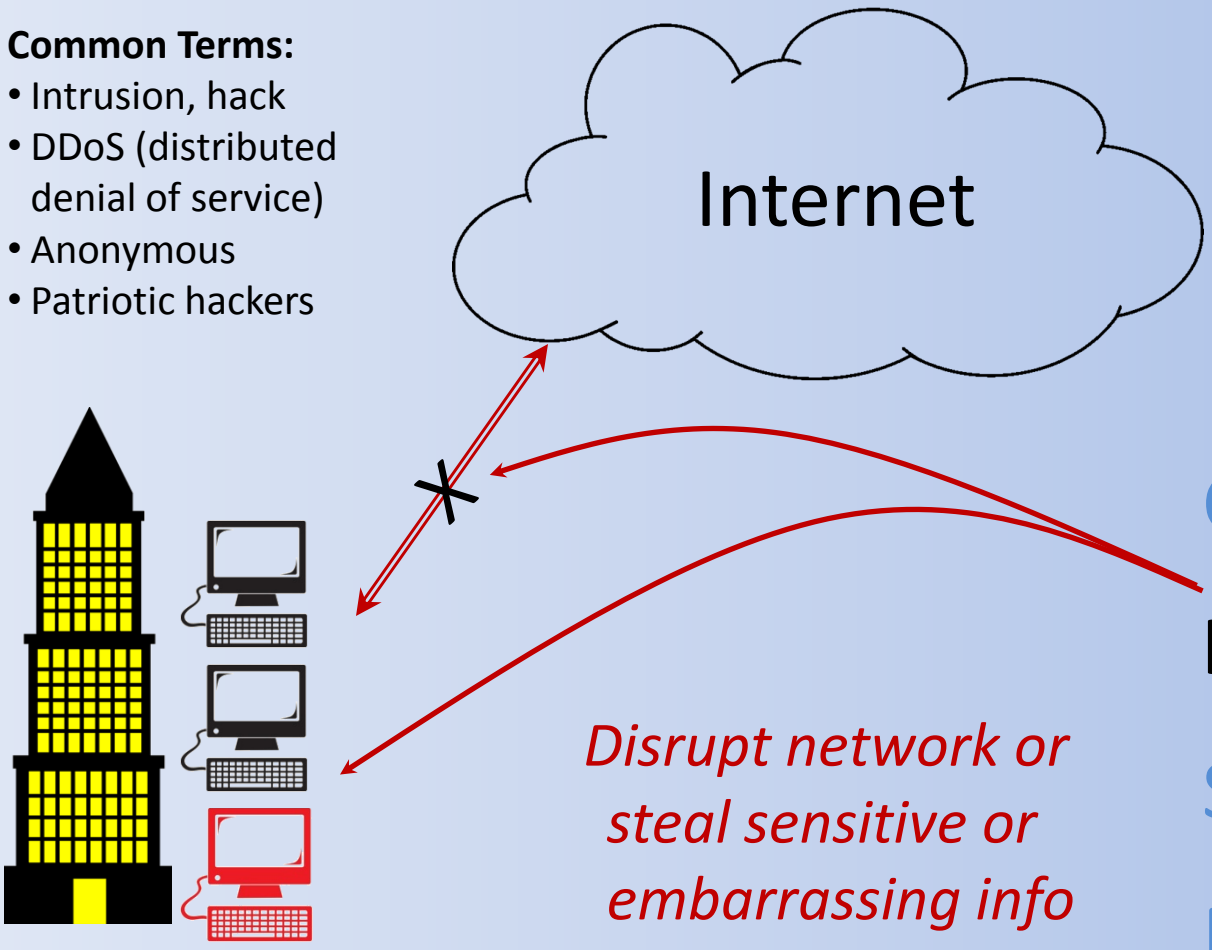
Spies

Militaries



# Traditional Cyber Threats

**Common Terms:**
- Intrusion, hack
- DDoS (distributed denial of service)
- Anonymous
- Patriotic hackers



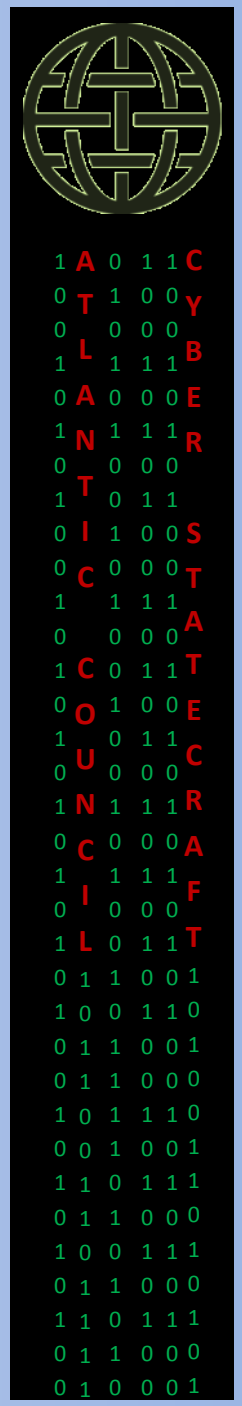

*Disrupt network or steal sensitive or embarrassing info*

Criminals

**Hactivists**

Spies

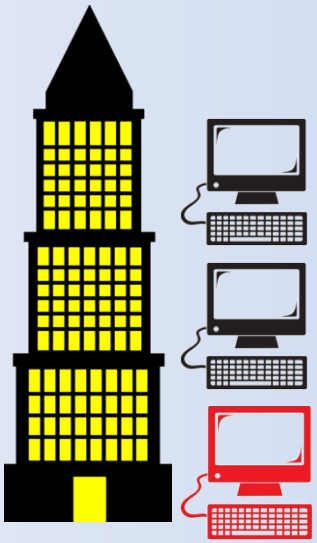
Militaries



# Traditional Cyber Threats

**Common Terms:**
- Intrusion, hack
- IP Theft
- China
- Advanced Persistent Threat

Internet



Corporation X

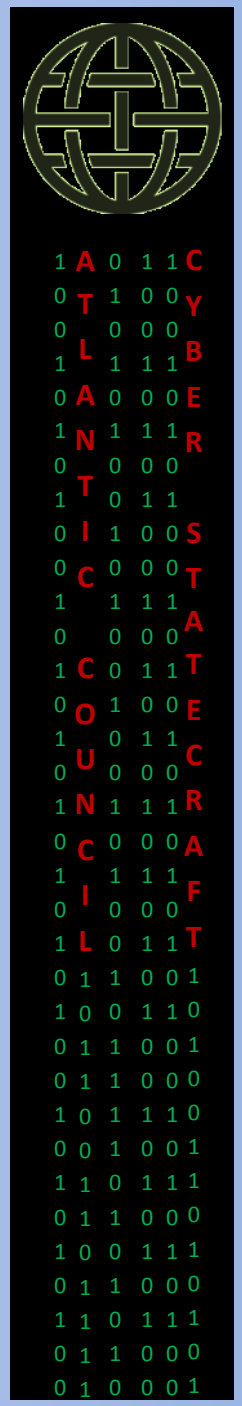
*Steal R&D, business plans or negotiating strategies*

Criminals

Hactivists

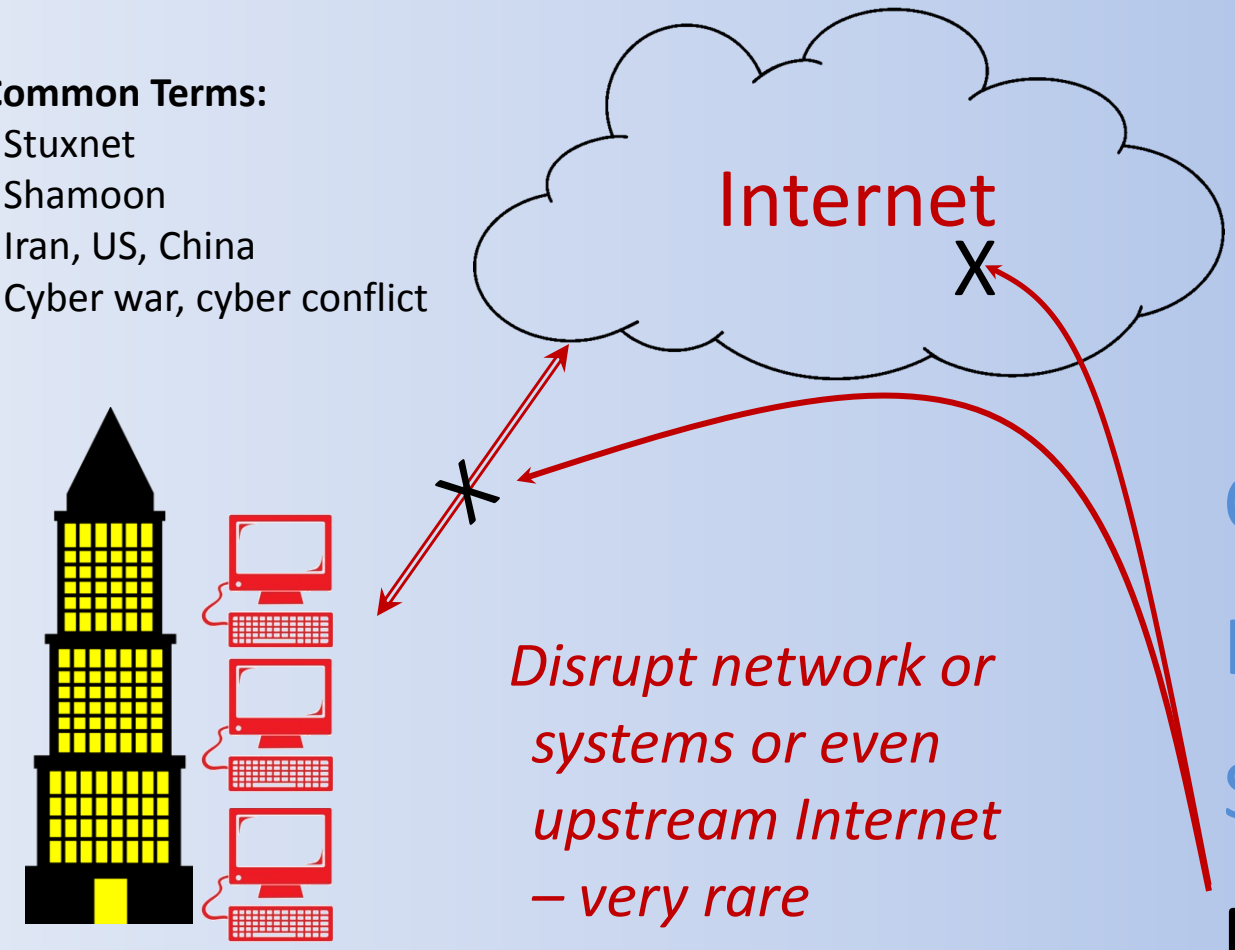
**Spies**

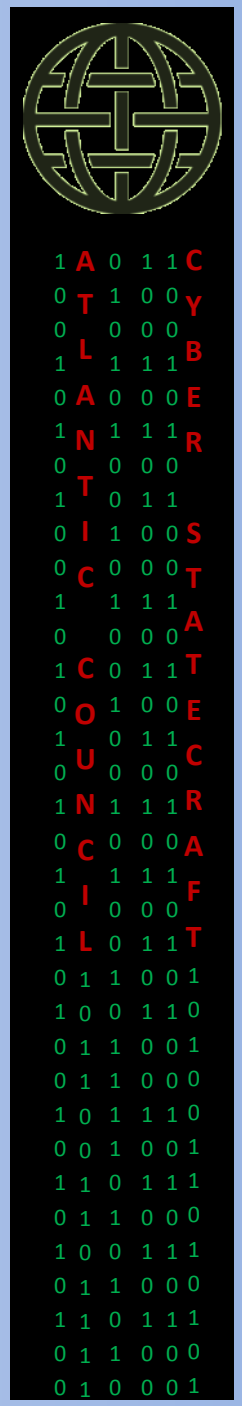
Militaries



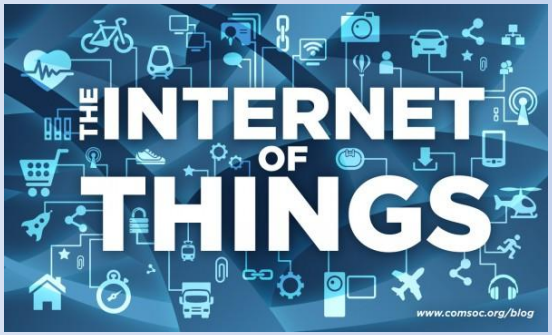
# Traditional Cyber Threats

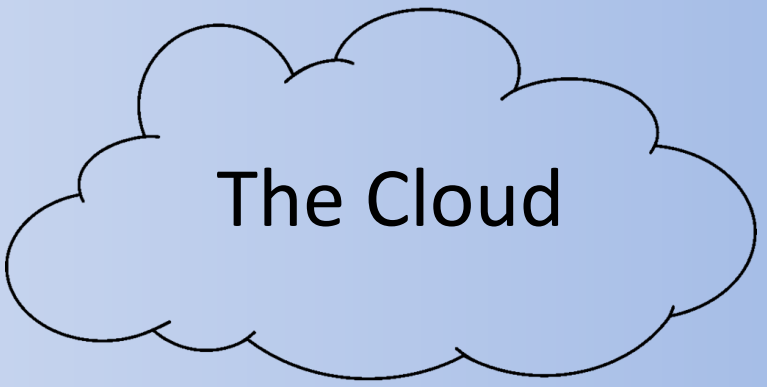
**Common Terms:**
- Stuxnet
- Shamoon
- Iran, US, China
- Cyber war, cyber conflict

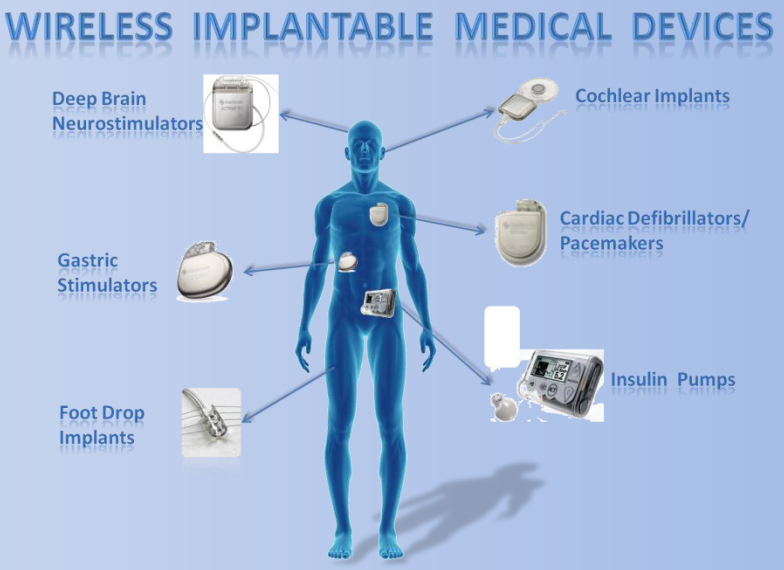


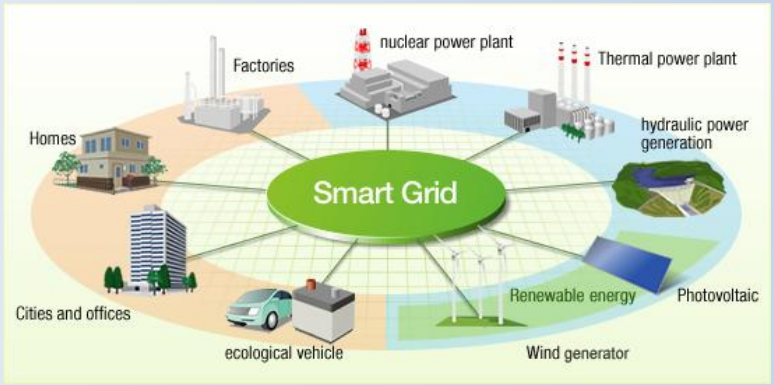



# Non-Traditional Cyber Threats



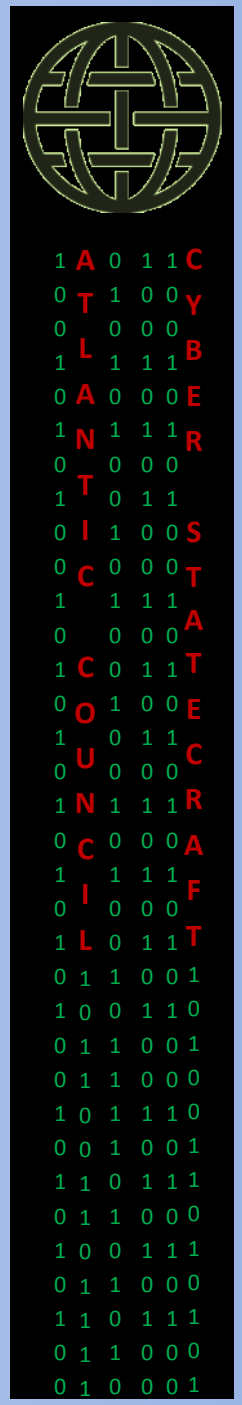



# But This is All at the Level of Individual Organization

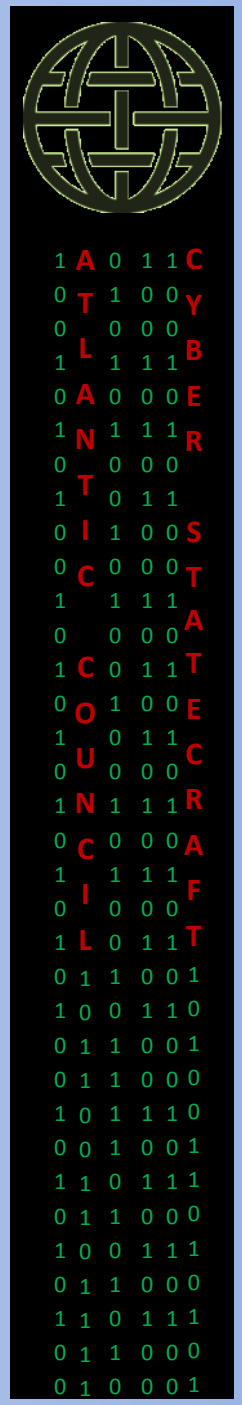
## *What About the Systemic Risks?*

Mainstream cyber risk management is markedly similar to that for financial *prior* to 2008!



# Cyber Sub-Prime

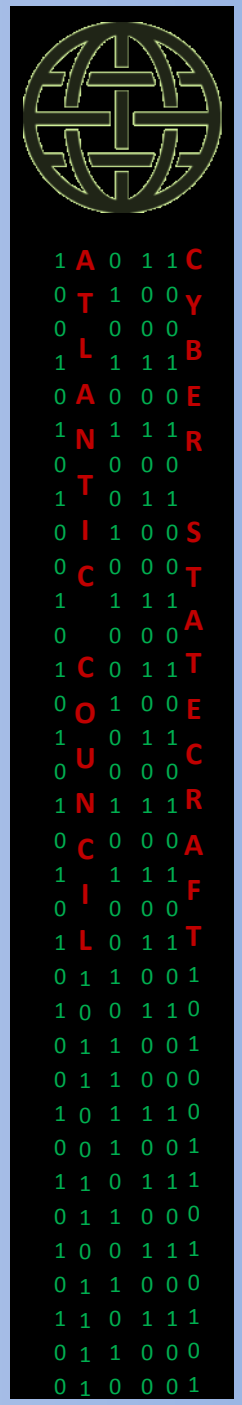
- Cyber is in the same place finance was prior to 2008
- Examination of cyber risk pools
- Analysis of key factors
- Recommendations



# Cyber Sub-Prime

## Cyber is in the same place finance was prior to 2008

- Risk only examined one organization at a time
- Risks passed outside organization into unknown pools
- Little if any governance of the system as a whole and complex interdependencies ignored
- Led to catastrophic global failure, even for those organization which handled internal risks correctly!
- We are heading for similar fate with global aggregation of cyber risk



# Overlapping Pools of *Systemic* Cyber Risk

## Outsourced and Contract

- China, India
- Manufacturing
- Professional: HR, legal, accounting, consultancy
- Defense industrial base

## Upstream Infrastructure

- Electrical, finance
- Bandwidth and Internet infrastructure like IXPs, submarine cables, security tokens
- Embedded devices: ICS, SCADA
- Some key companies: MSFT
- Networking standards like BGP and DNS
- Internet governance

## External Shocks

- Conflicts, malware pandemics
- States: China, Russia, US
- Non-states: Activists, Anonymous, organized crime
- Intrusion, disruption, theft of IP, espionage

## Supply Chain

- China
- Counterfeit components, software
- Global logistics chain

## Internal Enterprise

- Desktop, server, data centers, networks, security
- Software: in-house, legacy, custom, commercial, open source,

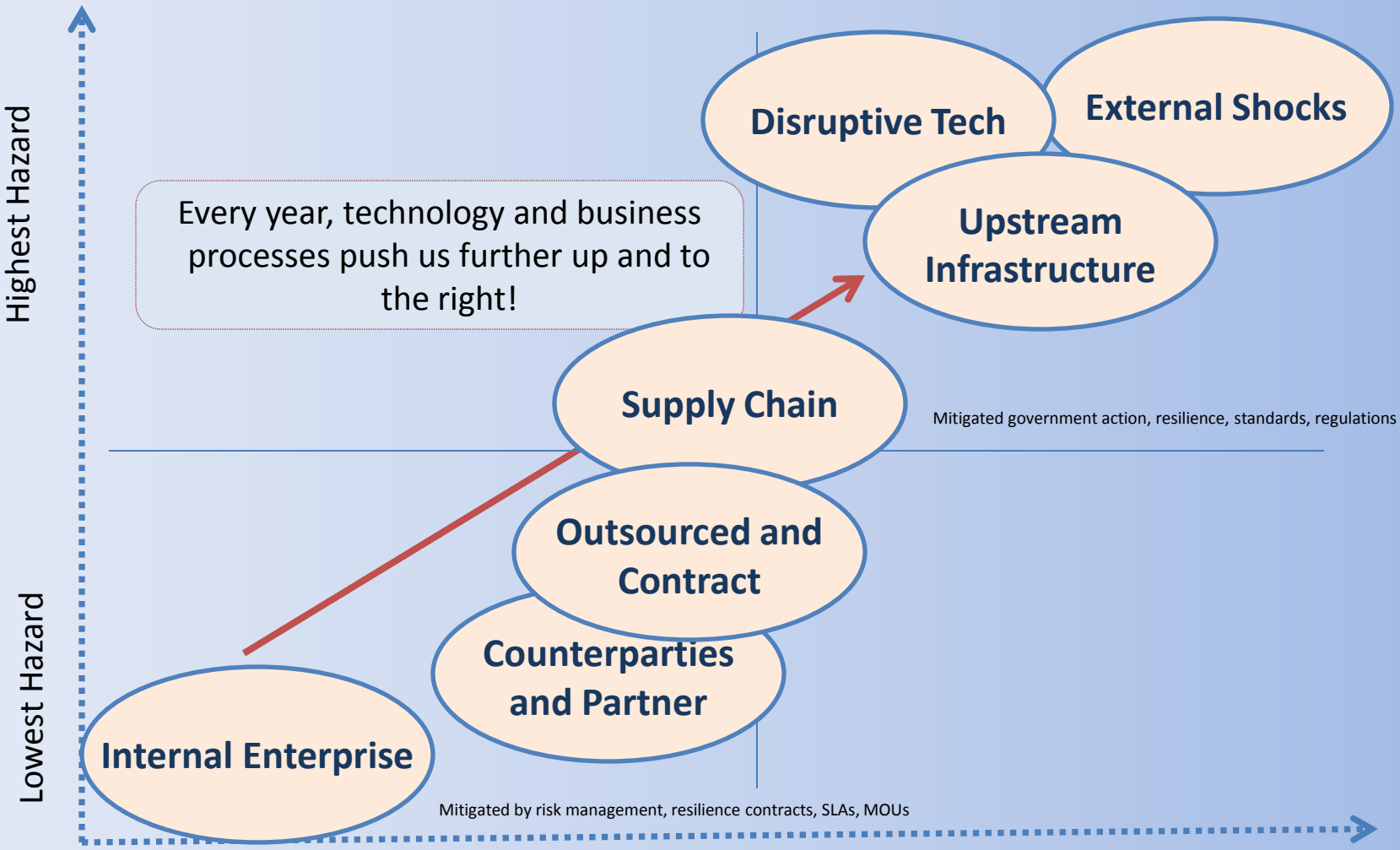
## Counterparties and Partner

- Trusted interconnections
- Dependence

## Disruptive Tech

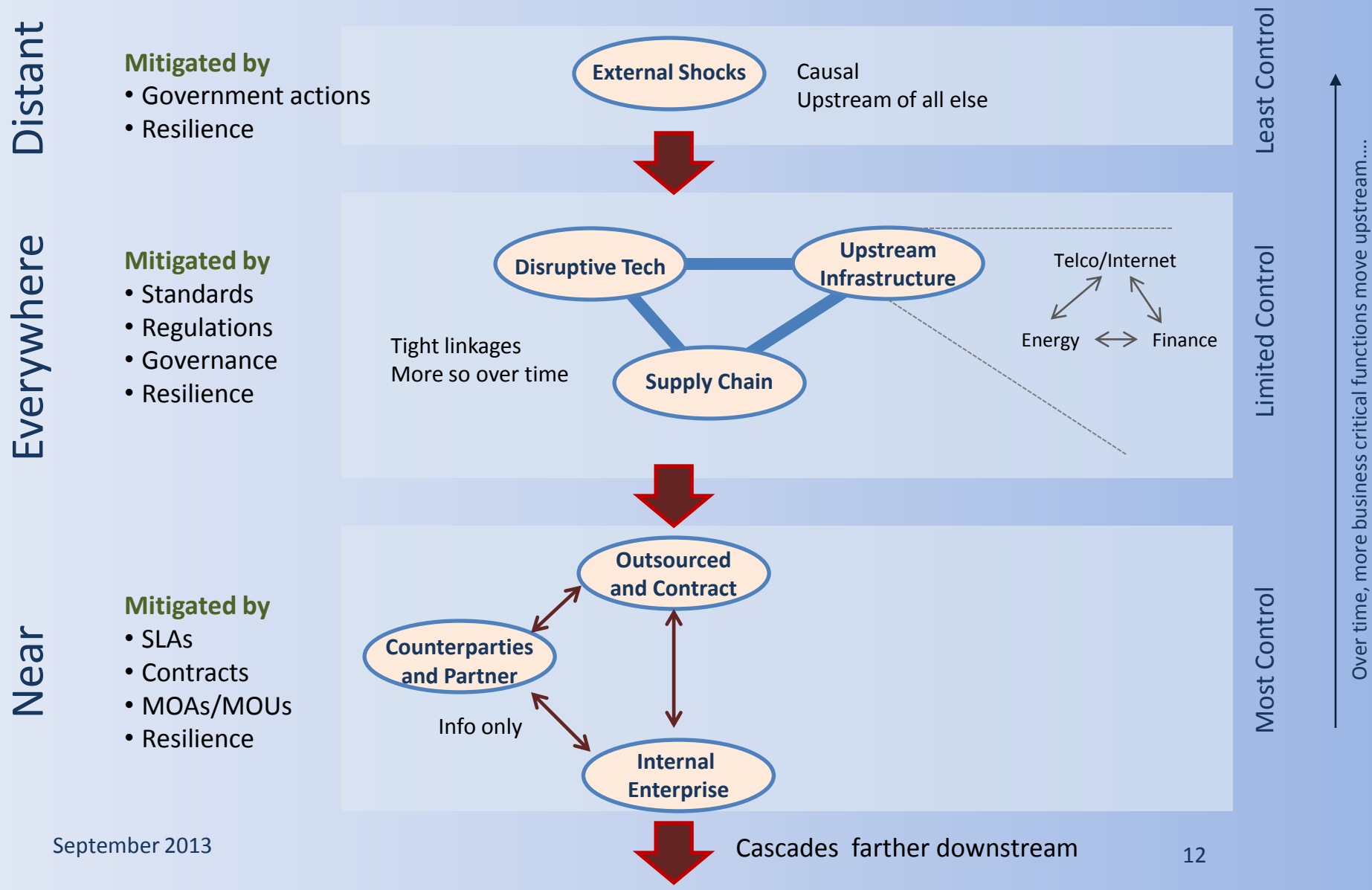
- Internet of everything and digital economy largely w/o human intervention
- Embedded medical, human enhancement, driverless cars, etc

# Notional Quad Chart



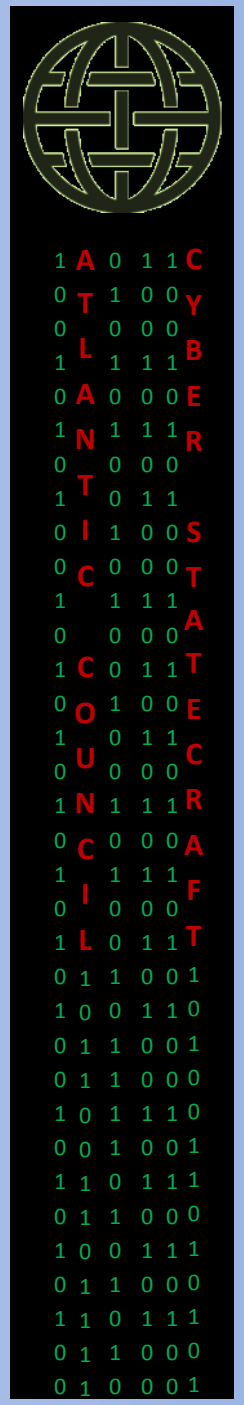
# Notional Chart of Upstream Risks

## Three Zones of Risk (?)



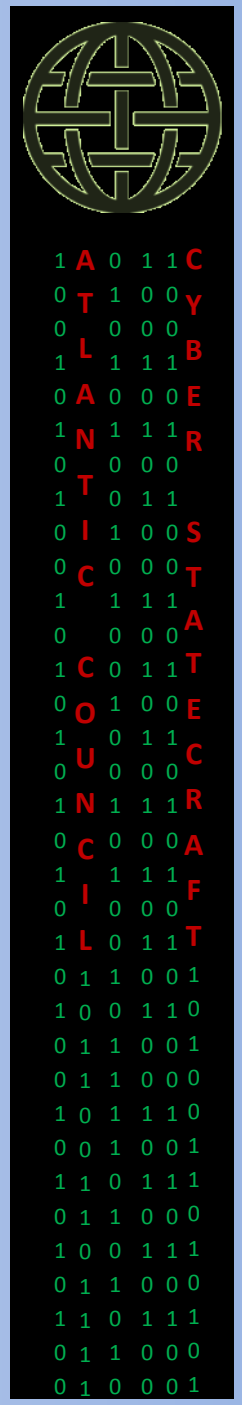
# Analysis: The Upside

- Few if any *single* shocks could affect cyberspace in any way that could transfer into a strategic shock to the global economy
  - Defenders are excellent at responding
  - System has been extremely resilient day-to-day and year-to-year



# Analysis: The Downside

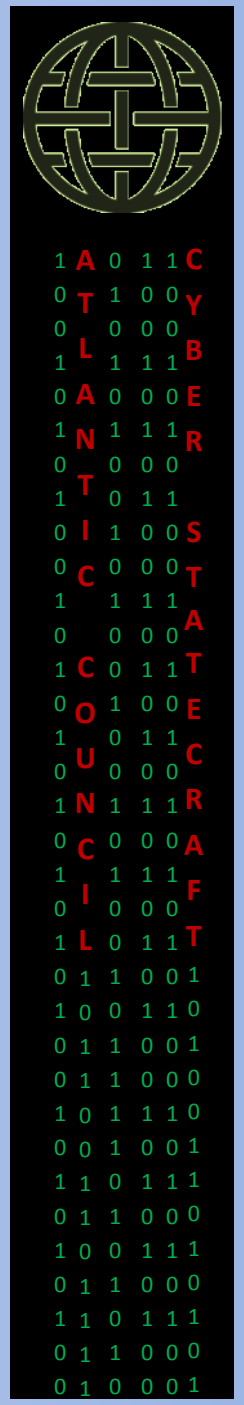
- Three separate vulnerabilities: interconnectedness and complexity, lack of transparency, and lack of either local control or system-wide governance
  - Everything increasingly interdependent in unknowable ways
  - Tech and business models continue to push major risks away from management understanding and control
  - No system-wide governance
  - In the face of catastrophic failures, not clear who would be in charge or what levers they could use
  - Few backup paths for crisis communication or manual workarounds



# Therefore

- Main concern is a failure of multiple key elements could lead to cascading failures
  - Where is the next Lehman? The next sub-prime?

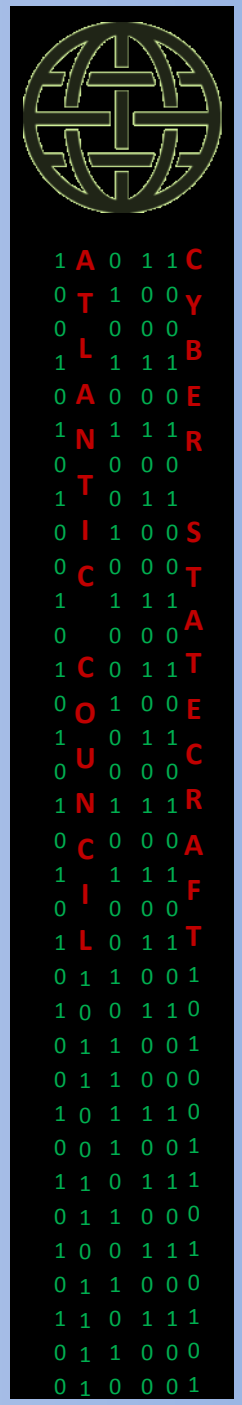
Expected future: Organizations will suffer ever more frequent shocks like natural disasters … too severe to ever be able to sufficiently protect



# How?

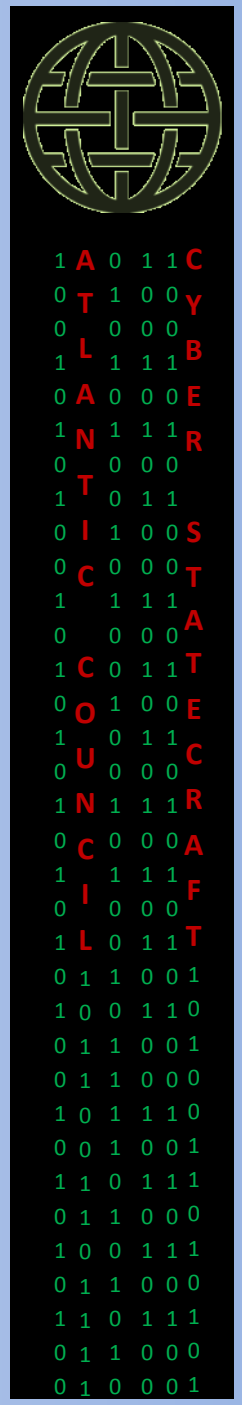
- Either one shock that cascades completely out of control or multiple shocks which cascade and reinforce one another

- Examples: California earthquake, large cloud provider goes bust (Enron-style fraud, Lehman-style misunderstanding of risk, etc), major routing protocol failure or attack, slow deterioration of resilience and defenses over time, major GPS outage takes out global precision navigation and time signals



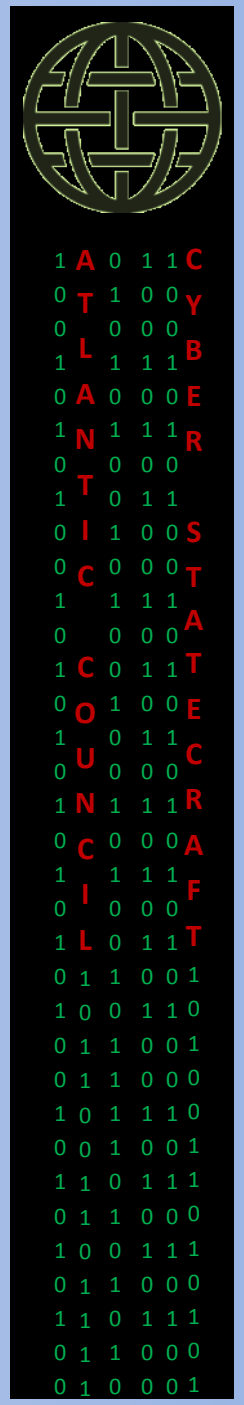
# Three Recommendations for Companies

1. Organizations can take **basic and advanced mitigations**, depending on their maturity and resources
2. However, since so much risk is external, complex, and interdependent then **resilience is the main hope for companies**
3. Board-level **strategic risk management** including insurance and other risk transfer options



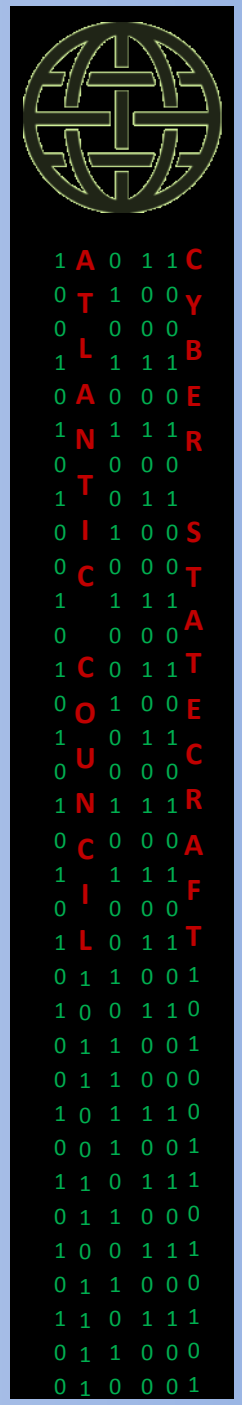
# Two Recommendations for Governments and System-Wide Organizations

1. Far more focus on systemic rather than organizational risk
2. Eventual goal for defense to be better than offense



# Need for Strategic Exercises

- Many exercises look only to the technical or organizational levels for solutions
- Private sector companies are unaware of what strategic decisions are being made until it is too late
- Event non-cyber disasters can cause unknown threats



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