Managing Data Risk
A Consultant’s Guide

Roger Clarke
Xamax Consultancy Pty Ltd, Canberra
Visiting Professor, ANU RSCS and UNSW Law

http://rogerclarke.com/EC/MDR.html
http://rogerclarke.com/EC/MDR.pdf

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Categories of Threat

- **Environmental Events** (Acts of Gods or Nature)
- **Accidents**, caused by:
  - Humans who are directly involved
  - Other Humans
  - Artefacts and those Responsible for them
- **Attacks**, by:
  - Humans who are directly involved
  - Other Humans
  - Artefacts and Designers, Owners, Operators

The Conventional Security Model

- **Generic Threat**
  - Gives rise to
    - **Threatening Event**
      - Impinges on or Exploits
      - Vulnerability
      - Leads to
        - **Security Incident**
          - Leads to
            - **Harm**
              - Leads to
                - **Asset**

The Conventional Security Model + Stakeholder

- **Stakeholder**
  - has an interest in
    - **Harm**
      - Leads to
        - **Asset**
  - **Generic Threat**
    - Gives rise to
      - **Threatening Event**
        - Impinges on or Exploits
        - **Vulnerability**
        - **Security Incident**
          - Leads to
            - **Harm**
              - Leads to
                - **Asset**
The Conventional Security Model
+
Safeguards

http://rogerclarke.com/EC/SSACS.html#App1

Deterrent and Preventative Safeguards

Lightning strikes and bush-fires not permitted at this installation

CROCODILE-INFESTED SWAMP
Survivors will be prosecuted

The Conventional Security Model

http://rogerclarke.com/EC/SSACS.html#App1
Attacks

By Whom?

Principals
- Opportunists
- Hacktivists
- Vigilantes
- Organised Crime
- Corporations
- Nat Sec Agencies
- Nation-States

Agents
- Mercenaries

Why?

Politics
- Protest against action
- Retaliation / Revenge
- Public Safety / Nat Sec
- Espionage

Economics
- Financial Gain
- Financial Harm

Social/Cultural Factors
- Challenge
- Dispute
- Celebration

Summary of Key Terms

- **Threat**: A circumstance that could result in Harm
- **Vulnerability**: A susceptibility to a Threat
- **Threatening Event**: An occurrence of a Threat
- **Safeguard**: A measure to prevent, to enable detection or investigation of, or to mitigate Harm from, a Threatening Event
- **Risk**: “The likelihood of Harm arising from a Threat” A measure of the likelihood and/or seriousness of Harm arising from a Threatening Event impinging on a Vulnerability and not being dealt with satisfactorily by the existing Safeguards

Risk Assessment and Risk Management Processes

1. **Analyse** / Perform Risk Assessment
   1.1 Define the Objectives and Constraints
   1.2 Identify the relevant Stakeholders, Assets, Values and categories of Harm
   1.3 Analyse Threats and Vulnerabilities
   1.4 Identify existing Safeguards
   1.5 Identify and Prioritise the Residual Risks

2. **Design** / Prepare for Risk Management
   2.1 Identify alternative Safeguards
   2.2 Evaluate the alternatives against the Objectives and Constraints
   2.3 Select a Design or adapt alternatives to achieve an acceptable Design

3. **Do** / Perform Risk Management
   3.1 Plan the implementation
   3.2 Implement
   3.3 Review the implementation

Forms of Value in Data Assets

- **Intrinsic Value**: Debtors Ledgers, Share Registers, Land Registers
- **Operational Value**: Usefulness for Inventory Management
- **Competitive Value**: Usefulness to the organisation and its competitors
- **Reputational Value**: Capacity to influence perceptions of the organisation
- **Compliance Value**: Usefulness for fulfilling legal obligations
- **Personal Value**: The data subject’s ec/soc/psych interests
Categories of Harm to Data Assets

- **Inaccessibility (Confidentiality)**
  - Data Access
  - Data Disclosure
  - Data Interception
- **Quality (Integrity)**
  - Data when Collected
  - Data when Used
    - Modification
    - Corruption
    - Staleness
- **Accessibility (Availability)**
  - Data Existence
  - Data Loss
    - In Volatile Memory
    - In Non-Volatile Memory
  - Theft, Destruction, Malfunction
  - Data Inaccessibility

Categories of Compliance-Related Harm

- **General Statutory & Common Law Obligations**
  - Evidence Discovery Law
  - Financial Regulations
  - Directors' obligations re asset protection, due diligence, business continuity, risk management
  - Security Treaty Obligations
- **Confidentiality**
  - Corporate Strategic and Commercial
  - Governmental
- **Privacy**
  - Unauthorised Use, Disclosure / Data Breach
  - Storage in Data Havens

Multi-Stakeholder Risk Assessment and Risk Management

<table>
<thead>
<tr>
<th>Organisational Risk Assessment</th>
<th>Stakeholder A Risk Assessment</th>
<th>Stakeholder B Risk Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1.3 Review Objectives, Constraints</td>
<td>A1.3 Define Objectives, Constraints</td>
<td>B1.3 Define Objectives, Constraints</td>
</tr>
<tr>
<td>O1.4 Assets, Values, Hazards</td>
<td>A1.4 Assets, Values, Hazards</td>
<td>B1.4 Assets, Values, Hazards</td>
</tr>
<tr>
<td>O1.5 Threats, Vulnerabilities</td>
<td>A1.5 Threats, Vulnerabilities</td>
<td>B1.5 Threats, Vulnerabilities</td>
</tr>
<tr>
<td>O1.6 Existing Safeguards</td>
<td>A1.6 Existing Safeguards</td>
<td>B1.6 Existing Safeguards</td>
</tr>
<tr>
<td>O1.7 Residual Risks</td>
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<td>B1.7 Residual Risks</td>
</tr>
</tbody>
</table>

- **Proactive Strategies**
  - Avoidance
  - Deterrence
  - Prevention
  - Redundancy
- **Reactive Strategies**
  - Detection
  - Reduction / Mitigation
  - Recovery
  - Insurance
- **Non-Reactive Strategies**
  - Tolerance / Self-Insurance
  - Graceful Degradation
  - Graceless Degradation
Irresponsible Data Analytics

Robo-Debt

- ATO collects data relating to the financial year
- Centrelink relies on more finely-grained data: the fortnightly income of each welfare client
- Centrelink divided ATO’s annual figure by 26, and assumed it applied to each fortnight
- Centrelink inferred that many clients had mis-reported their income and been overpaid
- Centrelink declared those people owed money
- x30 Leap in case-load, so complaints were ignored
- Centrelink hired heavy-handed debt-collectors
- People suffered badly for 3 years as a result
- The program was in clear breach of the law
- Cost to the public purse $1 billion and rising

Responsible Data Analytics

A Business Process Model

The Hierarchy of Regulatory Forms

A View of Self-Regulation

Wolves herd sheep
not for the benefit of the sheep but for the benefit of the wolves

http://www.rogerclarke.com/DV/CRD17.html

http://www.rogerclarke.com/EC/GDA.html & BDBP.html

http://rogerclarke.com/EC/AIR.html#RF
The Hierarchy of Regulatory Forms

Infrastructural Regulation
- The mechanical steam governor
- Reinforce positive aspects, Inhibit negatives
- Automated ... Monitoring, Exception condition detection, Adjustment of parameters, Deployment of countermeasures, Suspension of activities
- Byproduct, Retro-fitted on, or Architected in
- Dam sluice-gates automatically adjust to water-level, water-flows, precipitation events
- Lessig’s ‘West Coast Code’ – computer and network architecture, standards and protocols
- ‘The [Extended] Laws of Robotics’

Managing Technology-Associated Risk
- The Conventional Security Model
- Risk Assessment
  - Processes
  - Applications
- Risk Management
  - Processes
  - Choices
- A Hierarchy of Regulatory Forms

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