

# INFORMATION STEWARDSHIP: AVOIDING DATA BREACHES AND MANAGING BIG DATA

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Security in  
knowledge



**RSA** CONFERENCE  
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Session Classification: Intermediate

# — ABSTRACT

- ▶ Information security continues to be a problem and this problem is increasing because of the volume, velocity and variety associated with big data. Given the amount of attention to this area and the wealth of standards and technology available – why does this problem still exist?
- ▶ This presentation will look at the nature of information security risks and describe how better information stewardship based on information centric security is essential to manage these risks.

# What is Information Worth?

Sometimes it seems that the only people who value information are those who want to steal it.



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# — Anti-Terrorist Plans?

## Mistake

Accidental  
Disclosure

Corner Cutting

Carelessness

▶ **Britain's most senior anti-terrorist policeman resigns.**

▶ Telegraph.co.uk

▶ 9<sup>th</sup> April 2009

# — Medical Records?

## Misuse

Abuse of  
privilege

Curiosity

Negligence

▶ **A record monetary penalty of  
£325,000 for a hospital:**

- ▶ [http://www.ico.gov.uk/enforcement/~media/documents/library/Data\\_Protection/Notices/bsuh\\_monetary\\_penalty\\_notice.ashx](http://www.ico.gov.uk/enforcement/~media/documents/library/Data_Protection/Notices/bsuh_monetary_penalty_notice.ashx)
- ▶ May 2012

# — Customer Data?

## Misuse

Data theft

Disclosure

Recklessness

### ▶ Mobile phone customer contract renewal data stolen.

- ▶ [http://www.ico.org.uk/~media/documents/library/Data\\_Protection/Notices/tmobile\\_summary.pdf](http://www.ico.org.uk/~media/documents/library/Data_Protection/Notices/tmobile_summary.pdf)
- ▶ December 2008

# — Intellectual Property?

## Malice

Co-ordinated  
attacks

Social  
Engineering

Blackmail

### ▶ **Open Letter to RSA Customers.**

▶ <http://www.rsa.com/node.aspx?id=3872>

▶ March, 2011

# More and More Data!

“Just as oil was likened to black gold, data takes on a new importance and value in the digital age.”

**Neelie Kroes**

Vice-President of the European Commission responsible  
for the Digital Agenda

December 2011



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# — Big Data Explosion

## Volume

- According to IDC, 2.8ExaBytes ( $10^{18}$ ) of data will have been created and replicated in 2012

## Velocity

- LHC at CERN generates 600 million events per second

## Variety

- Text, voice, photo and video as well as instrumentation.

# — New Technologies

## Volume

Hadoop - MapReduce

Elastic Map Reduce

## Velocity

IBM InfoSphere  
Streams

Twitter Storm

Yahoo S4

NoSQL - databases

## Variety

Natural Language  
processing

XML stores

Graph stores

# — Smart Information

- ▶ Smart information is Big Data Analysed to create value

## Big Data

Symbols without context  
processed or stored by a  
computer

Millions of events in log files

## Smart Information

Big Data with interpretation  
and context that provides  
answers to questions

A pattern of events indicating  
fraudulent activity

# Big Data Risks and Threats

Information security risks for Big Data have similar root causes as for traditional information.



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# — Big Data makes it harder!

Big Data techniques make it harder to keep a secret

- Commoditization of techniques already used by intelligence agencies
- Inference drawn from many small pieces of data

Big Data Techniques can also be used by the bad guys

- Facilitate Identity theft
- Refine exploits and malware
- Analyse data breaches

# — Top Big Data Challenges

## Insecure Infrastructure

Secure distributed computing framework

Secure non SQL stores

Control access to multi level stores and logs

## Improper Analysis

Data provenance

Granular access control

Detect misuse and unauthorized access

## Assuring Compliance

Trust in data sources

Scalable Privacy

Auditing

[https://downloads.cloudsecurityalliance.org/initiatives/bdwg/Big\\_Data\\_Top\\_Ten\\_v1.pdf](https://downloads.cloudsecurityalliance.org/initiatives/bdwg/Big_Data_Top_Ten_v1.pdf)

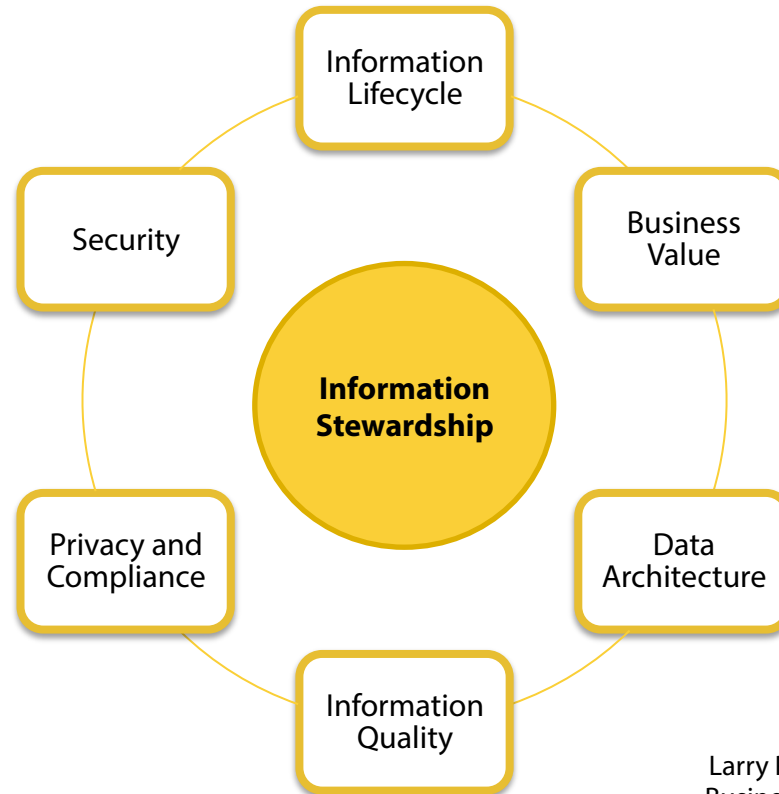
# Information Stewardship

Taking care to look after property that is not your own is called stewardship



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# — What is Information Stewardship?



Larry P. English, *Improving Data Warehouse and Business Information Quality*, John Wiley & Sons, 1999



# Achieving Information Stewardship

Information stewardship uses good governance techniques to implement information centric security.



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# — Pillars of Information Stewardship

Implement Information Governance

- Understand Business need and implement best practice.

Manage Information Lifecycle

- Know what you have and control what happens to it

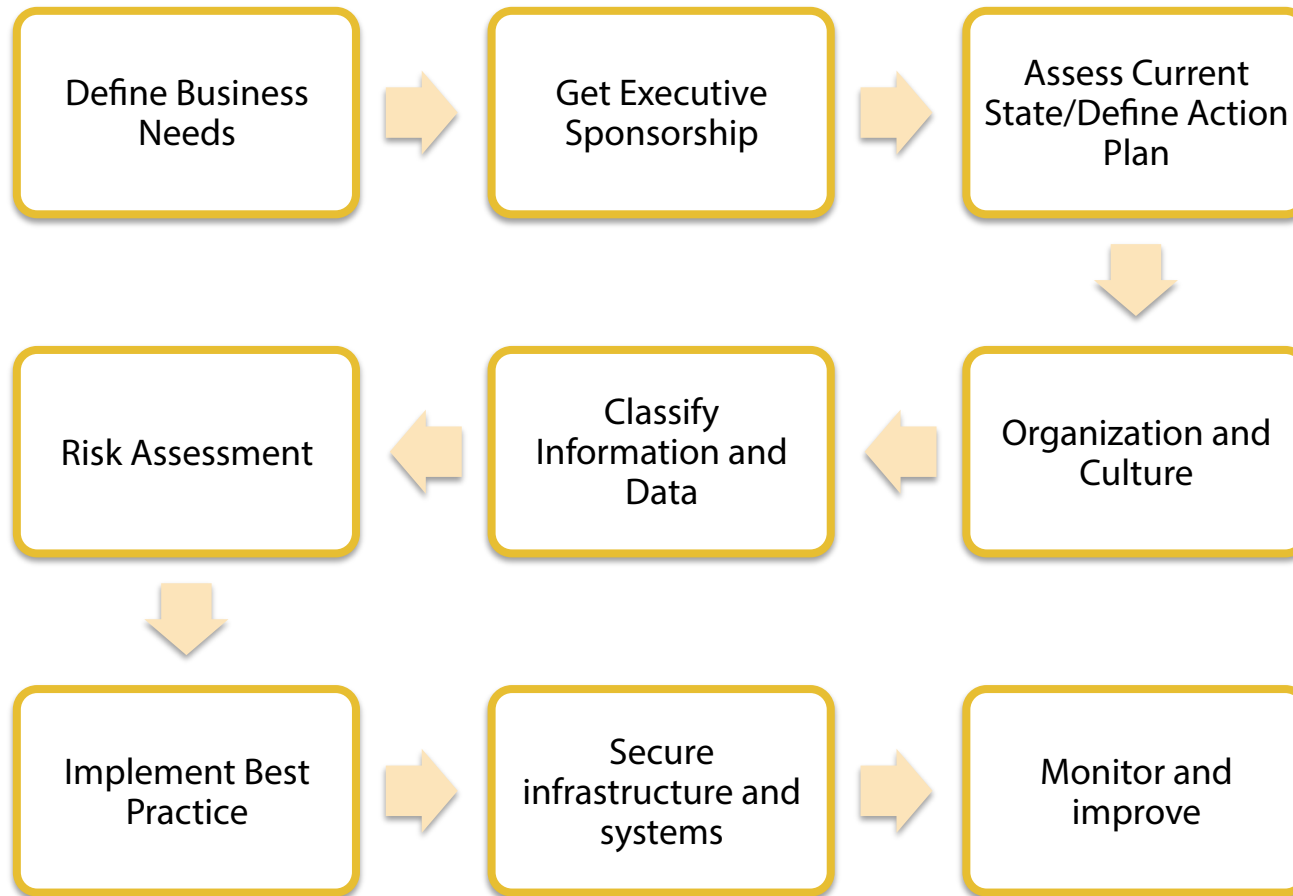
Information Security Culture

- Change the perception of security

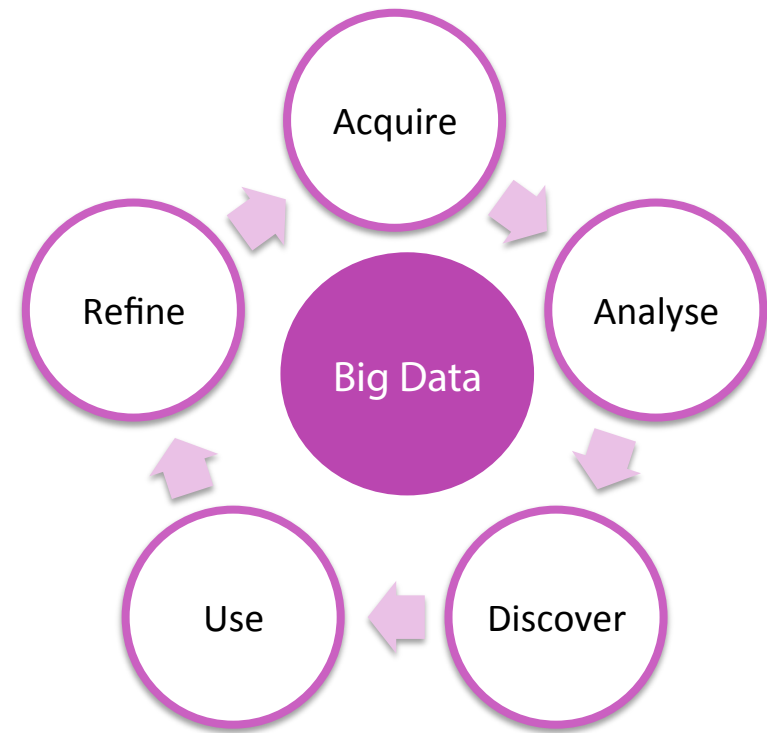
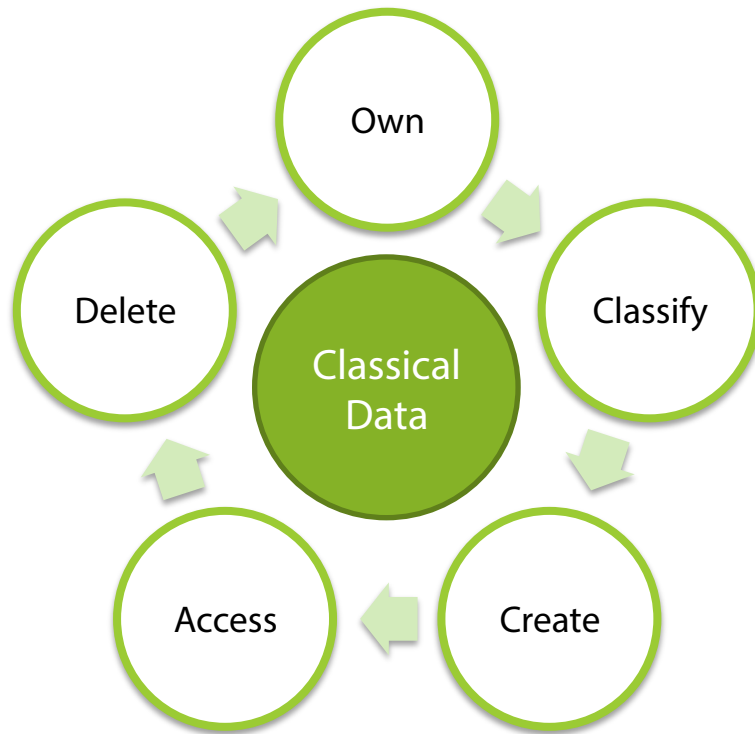
Information Security Organization

- Everyone is responsible for information security

# Information Governance



# Information Lifecycle

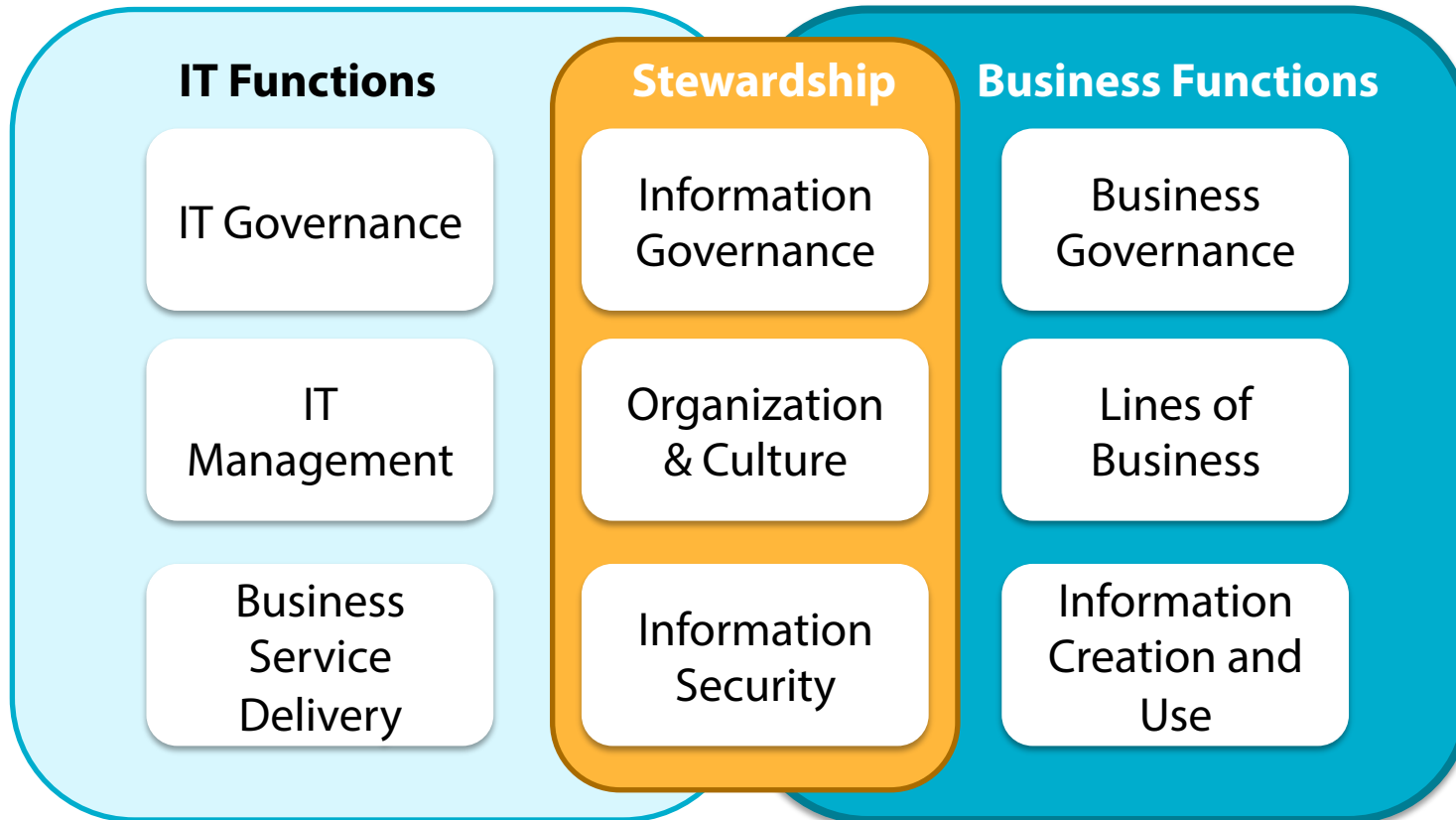


# — Security Culture



[http://www.isaca.org/Knowledge-Center/Research/Documents/WCCS\\_Creating\\_a\\_Culture\\_of\\_Security\\_31Mar2011\\_Research.pdf](http://www.isaca.org/Knowledge-Center/Research/Documents/WCCS_Creating_a_Culture_of_Security_31Mar2011_Research.pdf)

# — Organization



# Information Centric Security

IT organizations have not been well connected to the business. This has led to lines of business bypassing the disciplines involved in securely delivering IT services.



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# — Information Centric Security

Security Objectives

- Confidentiality, Integrity and Availability

Supporting Processes

- Policies, classification, access control, auditing

Essential Elements

- Procedures and Technologies



# Information Security Processes

## Classical Processes

Information  
Classification

Access Policies  
and Controls

Business Continuity Planning

Auditing

## Big Data Processes

Data purpose, ownership and  
compliance

Analysis verification, access  
control and disposal

Big Data Auditing

# Information Security Elements

## Classical Elements

Identity and Access Management

Privilege Management

Secure Storage

Flow Control

Infrastructure Security

Information Loss Resilience

Monitoring and review

## Big Data Elements

Data provenance verification

Privilege Management

Secure Big Data Storage

Secure Big Data Flow

Identity and Access Management

Monitoring and review

# Meeting the Challenges with Information Stewardship



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# — Managing Classical Risks

## Data Centre Risks

Secure Storage

Privilege Management

Information Flow Control

Infrastructure Security

## End User Device Risks

Identity and Access Management

DLP Technology

Mobile Device Management tools

## Human Interface Risks

Culture

Policies

Training

# — Meeting Big Data Challenges

## Secured Infrastructure

Verification

Change Control

Privilege management

Secured Storage

## Secured Analysis

Provenance Verification

Secured data flows

Access Governance

Secured Disposal

## Assured Compliance

Defined purpose

Informed consent

Control of use

Auditing

# Summary



The continuing problem of data leakage, data loss and data theft show that current approaches have proven inadequate. What is needed is better information stewardship



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# — Summary

## New Challenges

- Big data, unstructured data, new technology threats

## Human Factors

- Malice, Misuse and Mistake

## Information Stewardship

- Governance, culture, organization

## Information Centric Security

- Best practice processes and technologies

# Thank you!

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# — Information Sources #1

## ▶ Cloud Security Alliance

- ▶ Top Ten Big Data Security and Privacy Challenges v1

- ▶ [https://downloads.cloudsecurityalliance.org/initiatives/bdwg/Big\\_Data\\_Top\\_Ten\\_v1.pdf](https://downloads.cloudsecurityalliance.org/initiatives/bdwg/Big_Data_Top_Ten_v1.pdf)

## ▶ ENISA

- ▶ ENISA Threat Landscape (2012-09-28)

- ▶ [http://www.enisa.europa.eu/activities/risk-management/evolving-threat-environment/ENISA\\_Threat\\_Landscape/at\\_download/fullReport](http://www.enisa.europa.eu/activities/risk-management/evolving-threat-environment/ENISA_Threat_Landscape/at_download/fullReport)

## ▶ Larry P. English,

- ▶ Improving Data Warehouse and Business Information Quality,  
John Wiley & Sons, 1999

# — Information Sources #2

## ▶ ISACA

### ▶ Big Data: Impacts and Benefits

▶ <http://www.isaca.org/Knowledge-Center/Research/ResearchDeliverables/Pages/Big-Data-Impacts-and-Benefits.aspx>

### ▶ Creating a Culture of Security

▶ [http://www.isaca.org/Knowledge-Center/Research/Documents/WCCS\\_Creating\\_a\\_Culture\\_of\\_Security\\_31Mar2011\\_Research.pdf](http://www.isaca.org/Knowledge-Center/Research/Documents/WCCS_Creating_a_Culture_of_Security_31Mar2011_Research.pdf)

### ▶ Data Leak Prevention

▶ <http://www.isaca.org/Knowledge-Center/Research/ResearchDeliverables/Pages/Data-Leak-Prevention.aspx>

# — Information Sources #2

## ▶ KuppingerCole

- ▶ From Data Leakage Prevention (DLP) to Information Stewardship – 70587  
[http://www.kuppingercole.com/report/admsdk\\_informationstewardship70587301112](http://www.kuppingercole.com/report/admsdk_informationstewardship70587301112)
- ▶ From Big Data to Smart Information - 70750  
[http://www.kuppingercole.com/report/advisorynote\\_bigdatasmartdata70750140513](http://www.kuppingercole.com/report/advisorynote_bigdatasmartdata70750140513)
- ▶ Big Data and Information Stewardship - 70744  
[http://www.kuppingercole.com/report/executiveview\\_stewardship7074414052013](http://www.kuppingercole.com/report/executiveview_stewardship7074414052013)