

# **Data Classification, Security, and Privacy**

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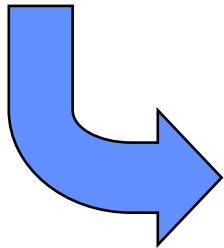
*Internal Audit Division*

**October, 2007**

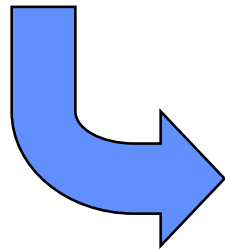
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- **Logical Relationship**
- **Historical Practices**
- **Future Trends**

**Information model**



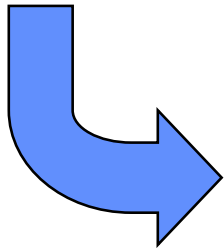
**Confidentiality, integrity, availability requirements**



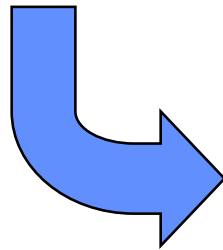
**Systems implementation**

*Note: Technically, an information classification program could start and end here. Existence of classification does not guarantee that associated requirements will be correctly developed or implemented.*

**Information model**



**Confidentiality, integrity, availability requirements**



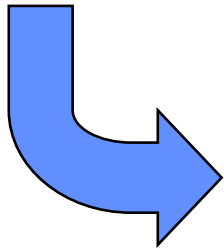
**Systems implementation**

## Quote from FFIEC InfoSec Handbook:

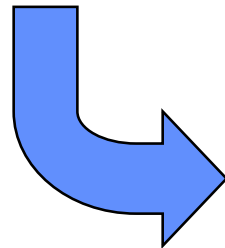
Institutions may establish an information data classification program to **identify** and **rank** data, systems, and applications in order of importance. Classifying data **allows** the institution to ensure **consistent protection** of information and other critical data throughout the system. Classifying systems **allows** the institution to **focus** its controls and efforts in an efficient and structured manner.

*Completeness of implementation  
requires information to be labeled or  
collected in a consistent manner and  
stored accordingly.*

**Information model**



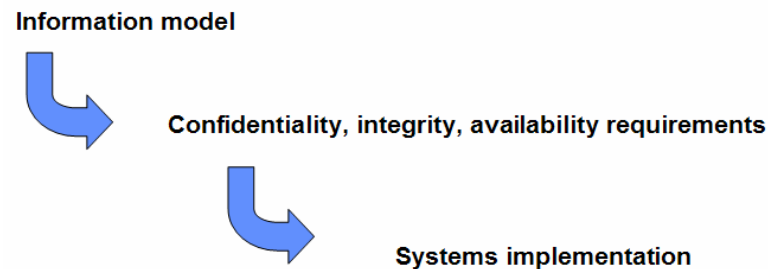
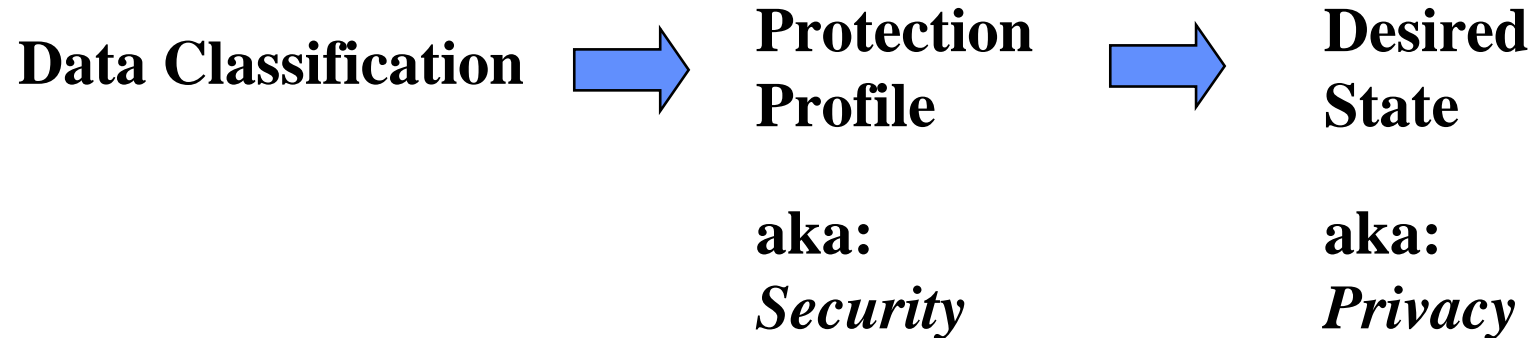
**Confidentiality, integrity, availability requirements**



**Systems implementation**

*Information model instantiation.*

**Expectation is that each activity makes it easier to achieve the next:**



<b>Model</b>	<b>Example</b>	<b>Protection Profile</b>	<b>Desired state</b>
<i><b>Military</b></i>	<i><b>Top Secret, Secret, Confidential, Public</b></i>	<i><b>System access according to level, no read up, no write down</b></i>	<i><b>Confidentiality</b></i>
<i><b>Common business adaptation</b></i>	<i><b>Mission critical, process-critical, non-public, public</b></i>	<i><b>Access and Change control over systems and applications according to level</b></i>	<i><b>Confidentiality, Integrity, Availability</b></i>
<i><b>Regulatory</b></i>	<i><b>PCI</b></i>	<i><b>Demonstrable due diligence for minimal access and quality controls at data level</b></i>	<i><b>Confidentiality, Integrity, Availability, Privacy</b></i>

# Military Requirements at System Level

**Require all information to be labeled as it is created**

**Store it only on systems that support these requirements:**

- **Prevent those at higher level from changing information at lower level (without an authorized change verification procedure)**
- **Prevent those at lower level from reading information at higher level**

**Protection Profiles for each system to cover information lifecycle:**

- **handling**
- **storage**
- **transmission**
- **disposal**

**Systems that store or transmit data of different sensitivities should be classified as if all data were at the highest sensitivity. Classification should be based on a weighted composite of all relevant attributes.**

*(source: FFIEC Information Security IT Examination Handbook)*

## Example of Reasonable Requirements

**Customized Protection Profiles for each system to cover information lifecycle, including:**

- **Network, system, and application access controls**
- **Audit trail for access and change tracking**
- **Segregation of duties for critical changes**
- **Confidentiality procedures at user level**
- **Quality and change control over automated processing**
- **Backup and retention**
- **Recovery Time and Point objectives**

**Actual protection measures are specifically proscribed for:**

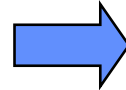
- **Network architecture**
- **Network transmission**
- **Data storage**
- **Operating system security**
- **Application entitlements**
- **Media handling**
- **External Audit**

*(source: PCI Security Standard Council)*

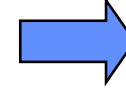
# Evolutionary Progression

**Military**

Data Labels



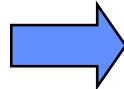
Rule-based  
Information  
Handling



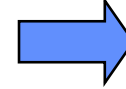
Confidentiality

**Business**

Data Classifications



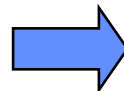
Protection  
Profile (via  
reasonableness  
standard)



Confidentiality,  
Integrity,  
Availability

**Regulatory**

Data Specification



Demonstrable  
Due  
Diligence



CIA, plus  
Privacy “by  
definition”

- *Were process rather than goal-oriented*
- *Relied on regulatory auditors to “raise the bar” on appropriate responses to risk*
- *Focused on aggregated data in systems and processes for handling, not on actual data content*
- *Did not entertain scenarios where multiple types of data in the same record in a single application or system should be treated differently at the infrastructure level*



*InfoSec management best practices (e.g. ISO) are currently focused **here**, not **here**.*

*Priorities are decided based on perception of threat and vulnerabilities – focus is on closing holes at low cost, or having business “accept risk.”*

*.....may generally be classified as*

- **Risk-Based**

- Priorities are decided based on perception of threat and vulnerabilities – focus is on closing holes

- **Compliance based**

- Priorities are decided based on requirements for due diligence using a reasonableness standard

*For the new era of regulatory approaches to Information Classification and associate control implementation, it needs to be goal-oriented.*

- ***Reasonable measures are not good enough***
- ***Known vulnerabilities are not tolerable***
- ***Regulatory requirements are coming from customers and business partners in the form of legal contracts***

# Example: Payment Card Industry (PCI) Standard

*PCI Data Security Standard (DSS) requirements are applicable if a Primary Account Number (PAN) is stored, processed, or transmitted.*

	Data Element	Storage Permitted	Protection Required	PCI DSS Req. 3.4
Cardholder Data	Primary Account Number (PAN)	YES	YES	YES
	Cardholder Name*	YES	YES*	NO
	Service Code*	YES	YES*	NO
	Expiration Date*	YES	YES*	NO
Sensitive Authentication Data**	Full Magnetic Stripe	NO	N/A	N/A
	CVC2/CVV2/CID	NO	N/A	N/A
	PIN / PIN Block	NO	N/A	N/A

\* *These data elements must be protected if stored in conjunction with the PAN.*

\*\* *Sensitive authentication data must not be stored subsequent to authorization (even if encrypted).*

# PCI DSS V1.1

- 1: *Install and maintain a firewall configuration to protect cardholder data***
- 2: *Do not use vendor-supplied defaults for system passwords and other security parameters***
- 3: *Protect stored cardholder data (3.4 – detail with respect to PAN)***
- 4: *Encrypt transmission of cardholder data across open, public networks***
- 5: *Use and regularly update anti-virus software***
- 6: *Develop and maintain secure systems and applications***
- 7: *Restrict access to cardholder data by business need-to-know***
- 8: *Assign a unique ID to each person with computer access***
- 9: *Restrict physical access to cardholder data***
- 10: *Track and monitor all access to network resources and cardholder data***
- 11: *Regularly test security systems and processes***
- 12: *Maintain a policy that addresses information security***

# Example Securities Industry Data Types

Account access  
(e.g. passwords, PINS)

Wide distribution nonpublic  
(e.g. research)

Confidential (but not NPI)  
counterparty

Firm Holdings

Confidential Firm Other

Executed and reported  
trades

Customer holdings

Employee compensation

Counterparty NPI

Employee NPI

Banking Deal Unannounced

Firm trade secrets

Banking Info Other

Pre-trade order flow

Public

*Are requirements as different as data types?*

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**Employee compensation**

**Employee NPI**

**Public**

*How many control groupings are there?*

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*Note:*

*this is your  
web page!*

*Is it necessarily a hierarchy of controls?*

# *Discussion*