

COURSEWARE

# INFORMATION SECURITY FOUNDATION

BASED ON ISO/IEC 27001 '22  
COURSEWARE

Information Security Foundation  
based on ISO/IEC 27001 '22  
Courseware

## Colophon

Title: Information Security Foundation based on ISO/IEC 27001 '22 Courseware

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## **Publisher about the Courseware**

The Courseware was created by experts from the industry who served as the author(s) for this publication. The input for the material is based on existing publications and the experience and expertise of the author(s). The material has been revised by trainers who also have experience working with the material. Close attention was also paid to the key learning points to ensure what needs to be mastered.

The objective of the courseware is to provide maximum support to the trainer and to the student, during his or her training. The material has a modular structure and according to the author(s) has the highest success rate should the student opt for examination. The Courseware is also accredited for this reason, wherever applicable.

In order to satisfy the requirements for accreditation the material must meet certain quality standards. The structure, the use of certain terms, diagrams and references are all part of this accreditation. Additionally, the material must be made available to each student in order to obtain full accreditation. To optimally support the trainer and the participant of the training assignments, practice exams and results are provided with the material.

Direct reference to advised literature is also regularly covered in the sheets so that students can find additional information concerning a particular topic. The decision to leave out notes pages from the Courseware was to encourage students to take notes throughout the material.

Although the courseware is complete, the possibility that the trainer deviates from the structure of the sheets or chooses to not refer to all the sheets or commands does exist. The student always has the possibility to cover these topics and go through them on their own time. It is recommended to follow the structure of the courseware and publications for maximum exam preparation. This courseware includes the official manual. The pages following the manual contain the courseware and syllabus.

The courseware and the recommended literature are the perfect combination to learn and understand the theory.

-- Van Haren Publishing

## Other publications by Van Haren Publishing

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- IT and IT Management
- Architecture (Enterprise and IT)
- Business Management and
- Project Management

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Topics are (per domain):

### IT and IT Management

ABC of ICT  
ASL®  
CATS CM®  
CMMI®  
COBIT®  
e-CF  
ISO/IEC 20000  
ISO/IEC 27001/27002  
ISPL  
IT4IT®  
IT-CMF™  
IT Service CMM  
ITIL®  
MOF  
MSF  
SABSA  
SAF  
SIAM™  
TRIM  
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### Enterprise Architecture

ArchiMate®  
GEA®  
Novius Architectuur  
Methode  
TOGAF®

### Business Management

*BABOK® Guide*  
BiSL® and BiSL® Next  
BRMBOK™  
BTF  
EFQM  
eSCM  
IACCM  
ISA-95  
ISO 9000/9001  
OPBOK  
SixSigma  
SOX  
SqEME®

### Project Management

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DSDM/Atern  
ICB / NCB  
ISO 21500  
MINCE®  
M\_o\_R®  
MSP®  
P3O®  
*PMBOK® Guide*  
Praxis®  
PRINCE2®

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## Self-Reflection of understanding Diagram

*‘What you do not measure, you cannot control.’ – Tom Peters*

Fill in this diagram to self-evaluate your understanding of the material. This is an evaluation of how well you know the material and how well you understand it. In order to pass the exam successfully you should be aiming to reach the higher end of Level 3. If you really want to become a pro, then you should be aiming for Level 4. Your overall level of understanding will naturally follow the learning curve. So, it’s important to keep track of where you are at each point of the training and address any areas of difficulty.

Based on where you are within the Self-Reflection of Understanding diagram you can evaluate the progress of your own training.

<i>Level of Understanding</i>	<i>Before Training (Pre-knowledge)</i>	<i>Training Part 1 (1st Half)</i>	<i>Training Part 2 (2nd Half)</i>	<i>After studying / reading the book</i>	<i>After exercises and the Practice exam</i>
<i>Level 4 I can explain the content and apply it .</i>					
<i>Level 3 I get it! I am right where I am supposed to be.</i>					<i>Ready for the exam!</i>
<i>Level 2 I almost have it but could use more practice.</i>					
<i>Level 1 I am learning but don't quite get it yet.</i>					

(Self-Reflection of Understanding Diagram)

Write down the problem areas that you are still having difficulty with so that you can consolidate them yourself, or with your trainer. After you have had a look at these, then you should evaluate to see if you now have a better understanding of where you actually are on the learning curve.

**Troubleshooting**

*Problem areas:*

*Topic:*

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Part 1

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Part 2

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You have gone through the book and studied.

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You have answered the questions and done the practice exam.

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## Timetable

### Agenda with Exam

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#### Day 1

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- Introduction
- Module 1: About Exin
- Module 2: Information and security
- Lunch
- Module 3: Threats & risks
- Module 4: Approach and Organization
- Module 5:
  - 5.1: Organizational
  - 5.2: Human
  - 5.3: Physical
  - 5.4: Technical

---

#### Day 2

---

- Wrap up day 1
- Module 5: Measures continued
- Break
- Self study
- Lunch
- Module 6: Exam training
- Module 7: Exam explanation
- Wrap up / evaluation

# Agenda without Exam

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## Day 1

---

- Introduction
- Module 1: About Exin
- Module 2: Information and security
- Lunch
- Module 3: Threats & risks
- Module 4: Approach and Organization
- Module 5:
  - 5.1: Organizational
  - 5.2: Human
  - 5.3: Physical
  - 5.4: Technical

---

## Day 2

---

- Wrap up day 1
- Module 5: Measures continued
- Break
- Self study
- Module 6: Exam training
- Module 7: Exam explanation
- Wrap up / evaluation



# Foundation of Information Security



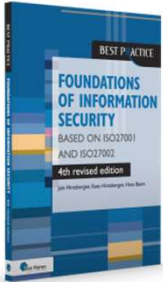
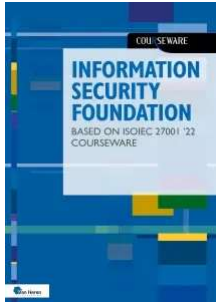

## Introduction

- Acquaintance and Study goals
- Rules
- Agenda



This Clipboard shows per slide in which paragraph (§) of the desk book you can find additional information.

## About the courseware

Study book      Courseware      Trainer slides

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## Agenda with Exam

Day 1		Day 2	
09.00 - 09.30	Introduction	09.00 - 09.20	Wrap up day 1
09.30 - 10.15	Module 1: About Exin	09.20 - 11.00	Module 5: Measures continued
10.15 - 12.00	Module 2: Information and security	10.05 - 10.20	Break
12.00 - 12.30	Lunch	11.00 - 12.00	Self study
12.30 - 13.15	Module 3: Threats & risks	12.00 - 13.00	Lunch
13.15 - 14.45	Module 4: Approach and organization	13.00 - 14.00	Module 6: Exam training
14.45 - 17.00	Module 5: Measures 5.1: Organizational 5.2: Human 5.3: Physical 5.4: Technical	14.00 - 15.00	Module 7: Exam explanation
		15.00 - 16.00	Wrap up / evaluation

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## Agenda without Exam

Day 1		Day 2	
09.00 - 09.30	Introduction	09.00 - 09.20	Wrap up day 1
09.30 - 10.15	Module 1: About Exin	09.20 - 12.00	Module 5: Measures continued
10.15 - 12.00	Module 2: Information and security	10.05 - 10.20	Break
12.00 - 12.30	Lunch	12.00 - 13.00	Lunch
12.30 - 13.15	Module 3: Threats & risks	13.00 - 14.00	Self study
13.15 - 14.45	Module 4: Approach and organization	14.00 - 15.00	Module 6: Exam training
14.45 - 17.00	Module 5: Measures 5.1: Organizational 5.2: Human 5.3: Physical 5.4: Technical	15.00 - 16.00	Module 7: Exam explanation
		16.00 - 16.30	Wrap up / evaluation



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## Foundation of Information Security Module I About this course



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COURSEWARE

## What is information security?

Information security concerns the definition, implementation, maintenance, enforcement and evaluation of a coherent system of measures to prevent unauthorized access, unlawful use, disclosure, disruption, modification, or destruction of information and that guarantees the availability, integrity and confidentiality of the (manual and automated) information provision.

There are many definitions, see:

[https://en.wikipedia.org/wiki/Information\\_security](https://en.wikipedia.org/wiki/Information_security)



## ISO/IEC 27001 and 27002

- 27001:
  - International standard for establishing, implementing, maintaining and continually improving an Information Security Management System (ISMS)
  - Describes what must be done
  - Organizations can get certified for this
- 27002:
  - Contains best practices
  - Describes how it should be done
  - Contains controls and measures
  - People can get certified



## About this course



## Course objectives

- Information and security
- Threats and risks
- Approach and organization
- Measures
- Legislation and regulations



## About ISFS

- Why ISFS
- What are benefits of examination
- Target group
- e-Competence Framework (e-CF)

## About EXIN

- EXIN
- Mission
- EXIN and information security

■ competence is covered   ■ partial coverage   ■ superficial coverage

e-Competence Level		1	2	3	4	5
C.2.	Change Support					
C.3.	Service Delivery					
C.4.	Problem Management					
E.3.	Risk Management					
E.8.	Information Security Management					

©EXIN Holding B.V.





## Exam requirements and weight

Exam requirements	Exam specifications	Weight
<b>1. Information and security</b>		<b>27.5%</b>
	1.1 Concepts relating to information	10%
	1.2 Reliability aspects	7.5%
	1.3 Securing information in the organization	10%
<b>2. Threats and risks</b>		<b>12.5%</b>
	2.1 Threats and risks	12.5%
<b>3. Security controls</b>		<b>52.5%</b>
	3.1 Outlining security controls	2.5%
	3.2 Organizational controls	15%
	3.3 People controls	7.5%
	3.4 Physical controls	10%
	3.5 Technical controls	17.5%
<b>4. Legislation, regulations, and standards</b>		<b>7.5%</b>
	4.1 Legislation and regulations	2.5%
	4.2 Standards	5%
	<b>Total</b>	<b>100%</b>



## ISFS exam specifications

- |  |  |
|--|--|
| <p><b>1 Information and security</b></p> <p>1.1 Concepts relating to information<br/>The candidate can...</p> <p>1.1.1 explain the difference between data and information.</p> <p>1.1.2 explain information security management concepts.</p> <p>1.2 Reliability aspects<br/>The candidate can...</p> <p>1.2.1 explain the value of the CIA-triangle.</p> <p>1.2.2 describe the concepts accountability and auditability.</p> <p>1.3 Securing information in the organization<br/>The candidate can...</p> <p>1.3.1 outline the objectives and the content of an information security policy.</p> <p>1.3.2 explain how to ensure information security when working with suppliers.</p> <p>1.3.3 outline roles and responsibilities relating to information security.</p> <p><b>2 Threats and risks</b></p> <p>2.1 Threats and risks<br/>The candidate can...</p> <p>2.1.1 explain threat, risk, and risk management.</p> <p>2.1.2 describe types of damage.</p> <p>2.1.3 describe risk strategies.</p> <p>2.1.4 describe risk analysis.</p> | <p><b>3 Security controls</b></p> <p>3.1 Outlining security controls<br/>The candidate can...</p> <p>3.1.1 give examples of each type of security control.</p> <p>3.2 Organizational controls<br/>The candidate can...</p> <p>3.2.1 explain how to classify information assets.</p> <p>3.2.2 describe controls to manage access to information.</p> <p>3.2.3 explain threat and vulnerability management, project management, and incident management in information security.</p> <p>3.2.4 explain the value of business continuity.</p> <p>3.2.5 describe the value of audits and reviews.</p> <p>3.3 People controls<br/>The candidate can...</p> <p>3.3.1 explain how to enhance information security through contracts and agreements.</p> <p>3.3.2 explain how to attain awareness regarding information security.</p> <p>3.4 Physical controls<br/>The candidate can...</p> <p>3.4.1 describe entry controls.</p> <p>3.4.2 describe how to protect information inside secure areas.</p> <p>3.4.3 explain how protection rings work.</p> <p>3.5 Technical controls<br/>The candidate can...</p> <p>3.5.1 outline how to manage information assets.</p> <p>3.5.2 describe how to develop systems with information security in mind.</p> <p>3.5.3 name controls that ensure network security.</p> <p>3.5.4 describe technical controls to manage access.</p> <p>3.5.5 describe how to protect information systems against malware, phishing, and spam.</p> <p>3.5.6 explain how recording and monitoring contribute to information security.</p> |
|--|--|



# ISFS exam specifications

## 4 Legislation, regulations, and standards

### 4.1 Legislation and regulations

The candidate can...

4.1.1 give examples of legislation and regulations relating to information security.

### 4.2 Standards

The candidate can...

4.2.1 outline the ISO/IEC 27000, ISO/IEC 27001, and ISO/IEC 27002 standards.

4.2.2 outline other standards relating to information security.



## Chapter 3

# ISFS basic concepts list

access control  
accountability  
annualized loss expectancy (ALE)  
annualized rate of occurrence (ARO)  
asset  
auditability  
authentication  
authorization  
availability  
backup  
biometrics  
business continuity management (BCM)  
certificate  
change management  
chief information security officer (CISO)  
classification  
code of conduct  
compliance  
confidentiality

information management  
information security management system (ISMS)  
information security manager (ISM)  
information security officer (ISO)  
information security policy  
information security strategy  
information system  
integrity  
likelihood  
non-disclosure agreement (NDA)  
Plan, Do, Check, Act (PDCA)  
personally identifiable information (PII)  
phishing  
privacy  
protection ring  
public key infrastructure (PKI)  
reliability  
risk

controls

- corrective
- detective
- insurance
- preventive
- reductive
- repressive (suppressive)

cryptography  
cyber crime  
damage

- direct damage
- indirect damage

data  
digital signature  
due care  
due diligence  
escalation  
exposure  
(business) impact  
incident cycle  
information  
information analysis

risk analysis

- qualitative risk analysis
- quantitative risk analysis

risk assessment  
risk management  
risk strategy

- risk avoiding
- risk bearing (risk acceptance)
- risk neutral

risk treatment  
security incident  
segregation of duties  
single loss expectancy (SLE)  
stand-by arrangement  
threat

- human threat
- non-human threat

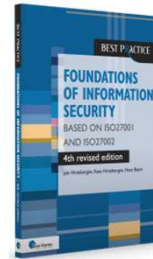
threat agent  
validation  
verification  
virtual private network (VPN)  
vulnerability



# ISFS literature

## Exam literature

A. Baars, H., Hintzbergen, J., and Hintzbergen, K.  
**Foundations of Information Security – Based on ISO 27001 and ISO 27002**  
 Van Haren Publishing: 4th fully revised edition, 2023  
 ISBN: 978 94 018 0958 0 (hardcopy)  
 ISBN: 978 94 018 0959 7 (eBook)



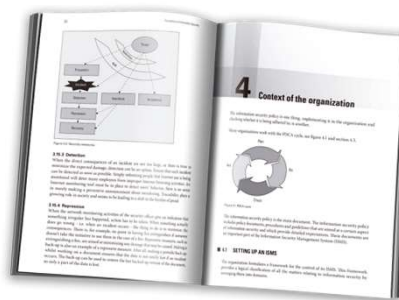
### Literature matrix

Exam requirements	Exam specifications	Reference
<b>1. Information and security</b>		
	1.1 Concepts relating to information	Chapters 3.1 - 3.3, 4.7 - 4.9
	1.2 Reliability aspects	Chapters 3.4, 4.4 - 4.6
	1.3 Securing information in the organization	Chapters 4.2, 4.3, 4.11 - 4.14, 5.1 - 5.6, 5.14, 5.19 - 5.23, 5.35, 7.7, 7.9, 7.10, 8.30
<b>2. Threats and risks</b>		
	2.1 Threats and risks	Chapters 3.5, 3.7, 3.9 - 3.11
<b>3. Security controls</b>		
	3.1 Outlining security controls	Chapters 3.8
	3.2 Organizational controls	Chapters 3.6.2, 5.3, 5.7 - 5.18, 5.24 - 5.30, 5.35, 5.36, 6.8
	3.3 People controls	Chapters 6
	3.4 Physical controls	Chapters 7
	3.5 Technical controls	Chapters 4.10, 8
<b>4. Legislation, regulations, and standards</b>		
	4.1 Legislation and regulations	Chapters 5.31 - 5.34
	4.2 Standards	Chapters 1, 3.6, 3.12, 4.1, 4.12, 5.36



# About the book

- Provides a basic understanding of information security
- Official training guide for EXIN exam Information Security Foundation
- Contains Case studies
- Contains a ISFS model exam
- Feedback to all multiple choice options



# Foundation of Information Security

## Module 2 Information and security, ISO 2700x

```
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96   <div class="carousel-caption">
97     <h1>One more for good measure.</h1>
98     <p>Cras justo odio, dapibus ac facilisis in, egestas eget quam. Donec at elit mi, quisque consectetur dapibus ut eu, gravida eros pellentesque eu. Nulla quisque ut lectus vitae ac ultricies quis quis dolor. Nam ipsum tellus at tortor molestie placerat. Donec vitae sapien ut libero venenatis faucibus. Nullam quis ante. Donec ante tempor egestas. Aenean sit amet justo nunc interdum sed rutrum auctor dapibus neque.</p>
99   </div>
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101 </div>
102 <a class="left carousel-control" href="#myCarousel" role="button" data-slide="prev">
103   <span class="glyphicon glyphicon-chevron-left" aria-hidden="true"></span>
104   <span class="sr-only">Previous</span>
105 </a>
106 <a class="right carousel-control" href="#myCarousel" role="button" data-slide="next">
107   <span class="glyphicon glyphicon-chevron-right" aria-hidden="true"></span>
108   <span class="sr-only">Next</span>
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116 </div>
```

Module 2

# THE CONCEPT OF INFORMATION

## Difference between data and information

- **Data:**
  - can be processed by Information technology
- **Information:**
  - Is derived from data by giving it meaning and value in a certain context

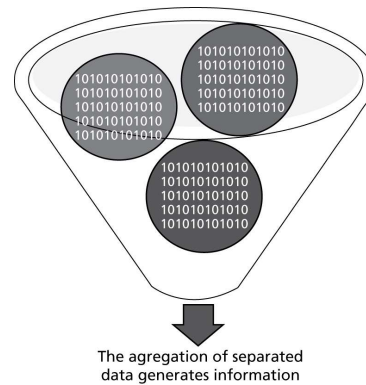


Figure 4.3 Aggregation of data generates information

Source: Foundations of IT Security Based on ISO27001/27002

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## Examples of elements that forms part of the basic infrastructure

- **Information Technology:**
  - Workstations;
  - Data transport via a network;
  - cabled or wireless;
  - Servers;
  - Data storage;
  - Mobile phones.
- **Information Systems:**
  - The combination of information technology to perform a business task.

But also:

  - File cabinets containing printed documents;
  - A printed phone directory.



Module 2

# VALUE OF INFORMATION

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Par 4.8, 4.9

## Information management and information analysis

### Information Management

- Manages information
- Focus on information as a resource
- Information governance
- Independent of form
- Stakeholders

### Information Analysis

- Handling of information
- Focuses on the use of information in the organization

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Par 4.8.4

## Value of data for organizations

- Data can have great significance
  - depending on how it is used
- Value is primarily determined by the user or the customer
  - How important is that data to perform a certain task



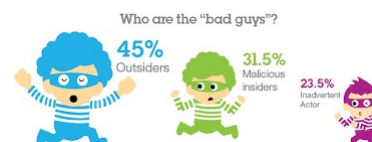
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Par 4.8.4

## Value of information for organizations

- Some people may consider a particular set of data uninteresting
- Others may be able to extract valuable information from it



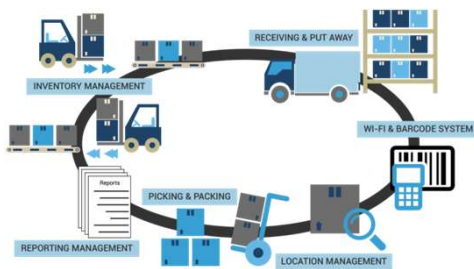
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## Why is information/data valuable?

- A warehouse that loses its customer and stock information would usually not be able to operate without it
- For an accountant's office, information is actually their only product.



## New in ISO 27002:2022; Think for yourself: the introduction of attributes

### Control types

- #Preventive
- #Detective
- #Corrective

### Information security properties

- #Confidentiality
- #Integrity
- #Availability

### Cybersecurity concepts

- #Identify
- #Protect
- #Detect
- #Respond
- #Recover

### Operational capabilities

- #Governance
- #Asset management
- #Information protection
- #Human resource security
- #Physical security
- #System and network security
- #Application security
- #Secure configuration
- #Identity and access management
- #Threat and vulnerability management
- #Continuity
- #Supplier relationships security
- #Legal and compliance
- #Information security event management
- #Security assurance

This means that the organization first thinks about how it wants to set up its ISMS, only then do you delve into the controls.





Module 2

## RELIABILITY ASPECTS



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Par 3.3

## Reliability aspects

Information security, protection of:

- Confidentiality (exclusivity)
- Integrity
- Availability



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## Fundamental principles of security

- All security controls, mechanisms and safeguards are implemented to provide one or more of these principles
- All risks, threats, and vulnerabilities are measured for their potential capability to compromise one or all of the CIA principles

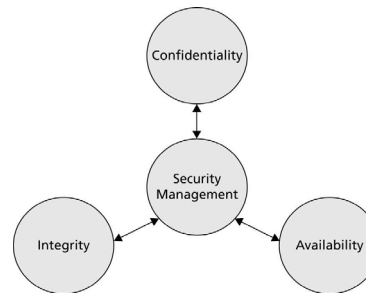


Figure 4.1 The CIA triangle

Source: Foundations of IT Security Based on ISO27001/27002

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## CONFIDENTIALITY

- the limits in terms of who can get what kind of information



## How applied information security concepts protect the value of data/information

- **Confidentiality**
  - Access to information is granted on a 'need to know' basis
  - Logical access management ensures that unauthorized persons or processes do not have access to automated systems, databases and programs.
  - A separation of duties is created between organizational units;
  - Strict separations are created between development, test and production
  - Measures are taken to ensure the privacy of personnel and third parties.



## INTEGRITY

- Integrity refers to being correct or consistent with the intended state of information.
- Any unauthorized modification of data, whether deliberate or accidental, is a breach of data integrity.



## How applied information security concepts protect the value of data/information

- **Integrity**
  - Changes in systems and data are authorized.
  - Where possible, mechanisms are built in that force people to use the correct term.
  - Users' actions are recorded (logged) so that it can be determined who made a change in the information;
  - Vital system actions, for example installing new software, cannot be carried out by just one person.



## AVAILABILITY

- The characteristics of availability are:
  - Timeliness;
  - Continuity;
  - Robustness.



## How applied information security concepts protect the value of data/information

- **Availability**
  - The management and storage of data is such that the risk of losing information is minimal;
  - Back-up procedures are set up.
- Statutory requirements for how long data must be stored will vary from country to country in EU, the USA, and elsewhere.



## Practice 1

- Consider your own or another company
- Determine the top 3 most important processes (first think about the criteria you want to use to determine this)
- Determine per process:
  - The owner
  - CIA requirements in terms of L/M/H
  - The information systems in use per process
  - What general types of data are processed (PII/financial/special PII/etc)?
  - Who owns the data?
  - Where does the system run?

(Write down on a whiteboard or flip over, and present)



## Questions

1. A database contains a few million transactions of a phone company. An invoice for a customer has been generated and sent. What does this invoice contain for the customer?
  - A. Data
  - B. Information
  - C. Data and information



## Questions

2. What is the difference between data and information?
  - A. Data can be any facts or figures. Information is data that has meaning.
  - B. Data consists of unstructured figures. Information consists of structured figures.
  - C. Data does not require security. Information requires security.
  - D. Data has no value. Information, which is processed data, has value.



## Questions

3. What is the focus of information management?
- A. Allowing business activities and processes to continue without interruption
  - B. Ensuring that the value of information is identified and exploited
  - C. Preventing unauthorized persons from having access to automated systems
  - D. Understanding how information flows through an organization



## Questions

4. An organization must understand the risks it is facing before it can take appropriate measures. What should be understood to determine risk?
- A. The likelihood of something happening and its consequences to the organization
  - B. The most common dangers and how to mitigate these as defined in best practices
  - C. The threats an organization faces and how vulnerable the organization is to them
  - D. The unplanned events an organization faces and what to do in case of such an event



# Foundation of Information Security

## Module 3 Threats and risks



Module 3

# THREATS AND RISKS



## Threat and threat agent

- A threat is a potential cause of an unwanted incident
- A threat agent is an entity that takes advantage of a vulnerability
- For example, a threat agent could be an intruder accessing the network through a port on the firewall,
- Or a process accessing data in a way that violates the security policy



## Risk

- A risk is the likelihood of a threat agent taking advantage of a vulnerability and the corresponding business impact.
- For example a fire can break out at your company;
- or an employee who does not work in the HR department gains access to private or sensitive information.



## Risk analysis

- Risk analysis is the process of:
  - Identifying assets and their value
  - Establishing a balance between the costs of an incident and the costs of a security measure
  - Determining relevant vulnerabilities and threats
- Risk management
  - The continuous process of performing risk assessments, i.e. identifying, assessing and controlling financial, legal, strategic and security risks for the organization
- A risk analysis ensures:
  - security measures are deployed in a cost-effective and timely manner, and
  - provide an effective answer to the threats
- Types:
  - Qualitative
  - Quantitative
  - And the combination of both



## Risk analysis main objectives

A risk analysis has four main objectives:

1. Identifying assets and their value
2. Determining vulnerabilities and threats;
3. Determining the risk that threats will materialize and disrupt the operational process;
4. Determining a balance between the cost of an incident and the cost of a security measure.

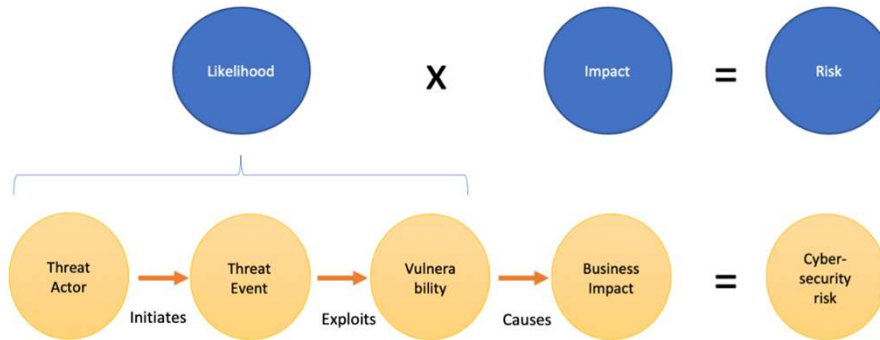
Don't forget:

Be able to compare risks and prioritize them to start with the highest risk



## Risk equation

- In basic the risk formula is based in (likelihood x business impact = risk)
- But there are many variants based on this
- For example the threat actor can also have certain amount of means and knowledge / skills
- You data can be more valuable for the threat actor or not



## Quantitative formulas

How does it fit together:

With the quantitative approach you need to compare different types of risk by comparing them to annual costs

AV – asset value (Asset value, all costs!)

EF – exposure factor (How much damage is expected when risk materialized))

SLE - single loss expectancy (AV x EF = SLE)

ARO – Annualized rate of occurrence (How often do you expect it can happen?)

ALE – Annualized Loss Expectancy (SLE x ARO = ALE)



## Threat intelligence and analytics

- Threat and Vulnerability Management ensures that vulnerabilities are discovered and closed in a timely manner.
- Security patches are installed as soon as they are known.
- When patches are not available, temporary other security measures are taken, if possible, to ensure that the vulnerability cannot be exploited

Threat intelligence is leading the way in this.

The organization does not wait for a notification from the vendor that a vulnerability has been found and that a patch is being worked on. The organization actively investigates whether new vulnerabilities have been found



## Explain the relationship between a threat and a risk

- A threat is a potential cause of an unwanted incident, which may result in harm to a system or organization.
- Risk relates to the potential that threats cause harm to an organization.

