Multi Order Dependency approaches for managing cascading effects in ports' global supply chain and their integration in risk assesment frameworks

Approaches for assessing physical & cyber risks in ports' Supply Chain Services

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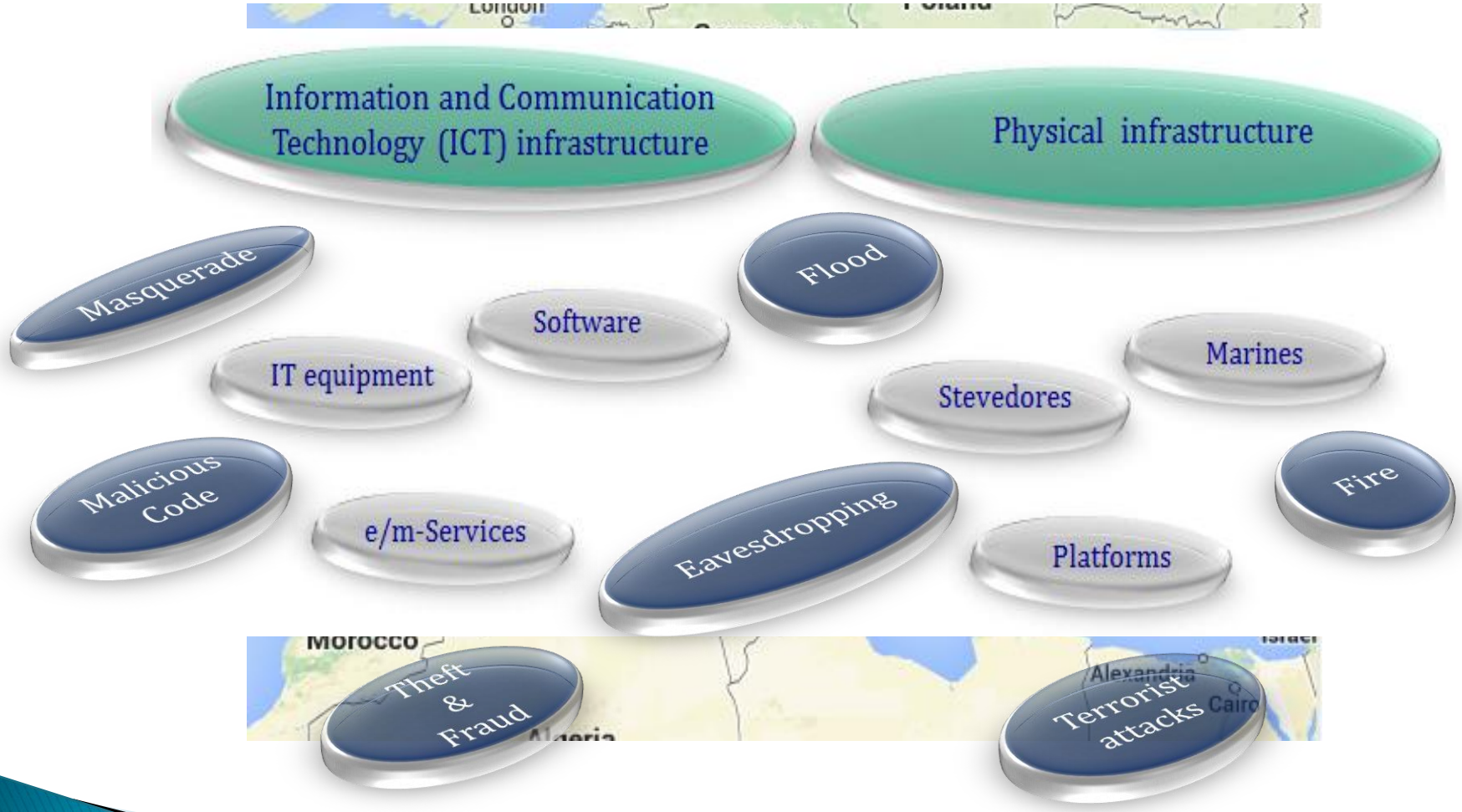
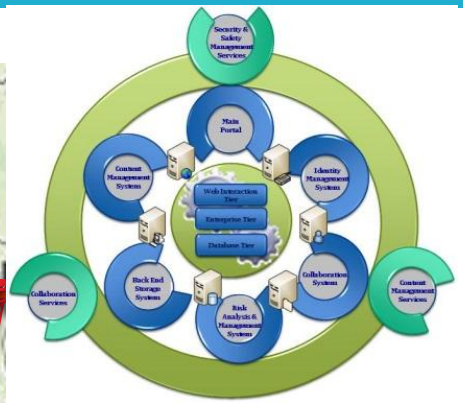
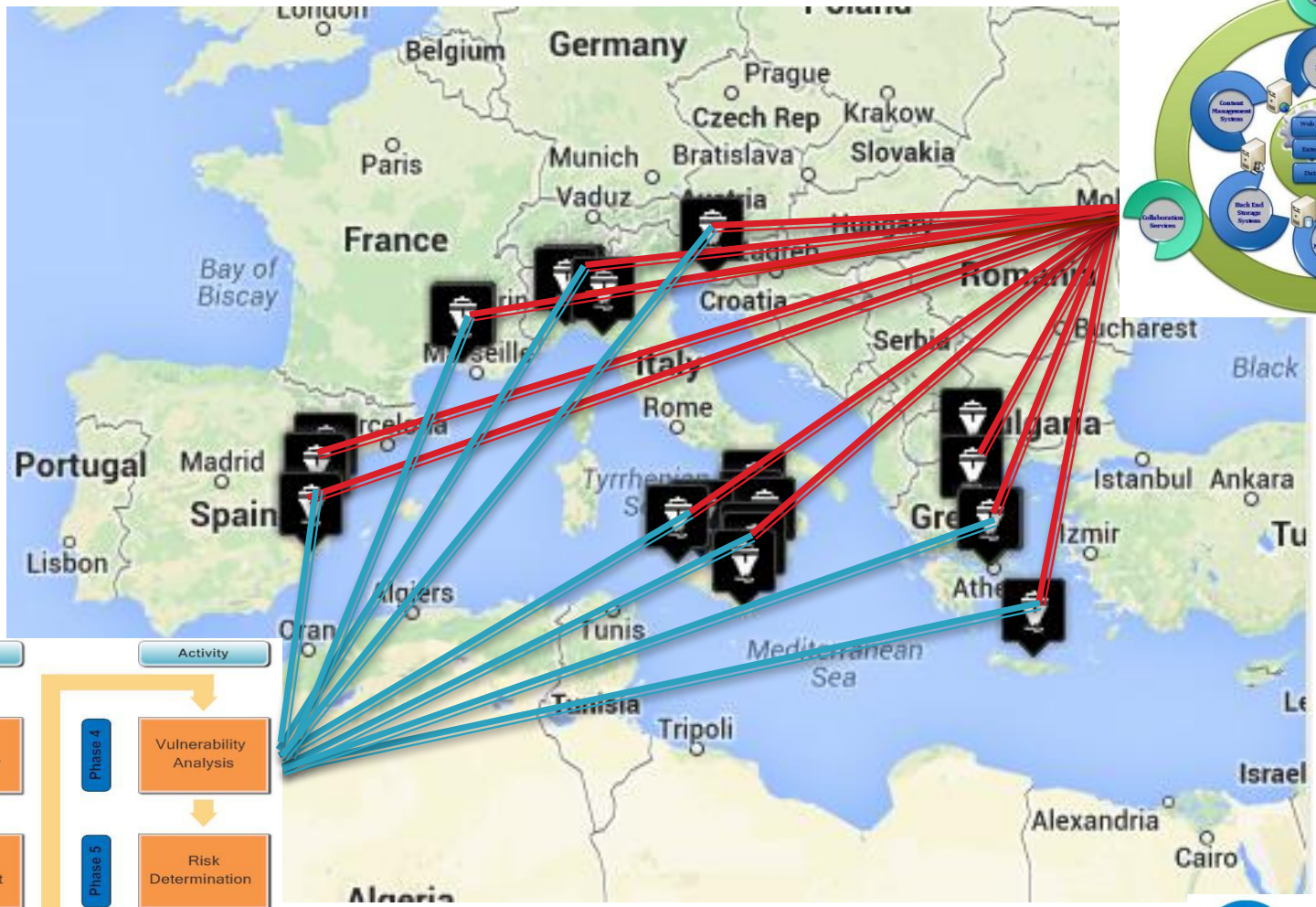
University of Piraeus (Greece)–Dept. of Informatics
Athens– 3rd December 2015
Κυβερνο-Ασφάλεια & Ναυτιλία – Ένα σύγχρονο πρόβλημα

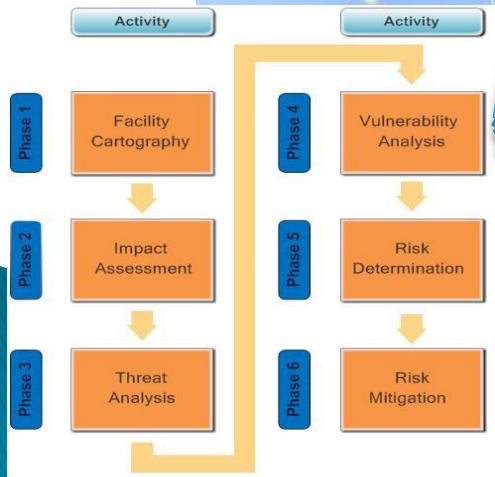
Maritime Sector



CYSM Outputs (cysm.eu)



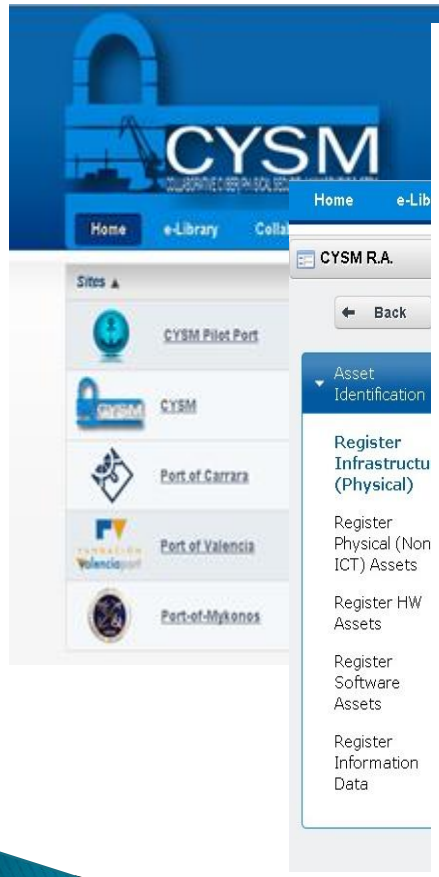




CYSM
COLLABORATIVE CYBER/PHYSICAL SECURITY MANAGEMENT SYSTEM

Cysm Security Management System

http://cysm.cs.unipi.gr/



IMO INTERNATIONAL MARITIME ORGANIZATION

E

MARITIME SAFETY COMMITTEE
95th session
Agenda item 4

MSC 95/INF.19
14 April 2015
ENGLISH ONLY

MEASURES TO ENHANCE MARITIME SECURITY

Cyberphysical relationship in port security

CYSM project – "Collaborative Cyber/Physical Security Management System"

Submitted by the European Commission

SUMMARY

Executive summary:	This document provides information on a project funded by the European Commission which aims to address potential gaps in security related to the cyberelements of port infrastructure
Strategic direction:	6.1
High-level action:	6.1.1
Planned output:	6.1.1.1
Action to be taken:	Paragraph 9
Related document:	MSC 94/21, paragraph 4.7

Telecommunication Room	Theft and Fraud	3	Lack of application safeguards leading to fraudulent payments being made	5
Telecommunication Room	Theft and Fraud	3	Inadequate monitoring of the organization premises	5

CYSM Consortium

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FUNDACIÓN valenciaport

ΟΛΠ PIRAEUS PORT AUTHORITY S.A.

UNIVERSITÀ DEGLI STUDI DI GENOVA

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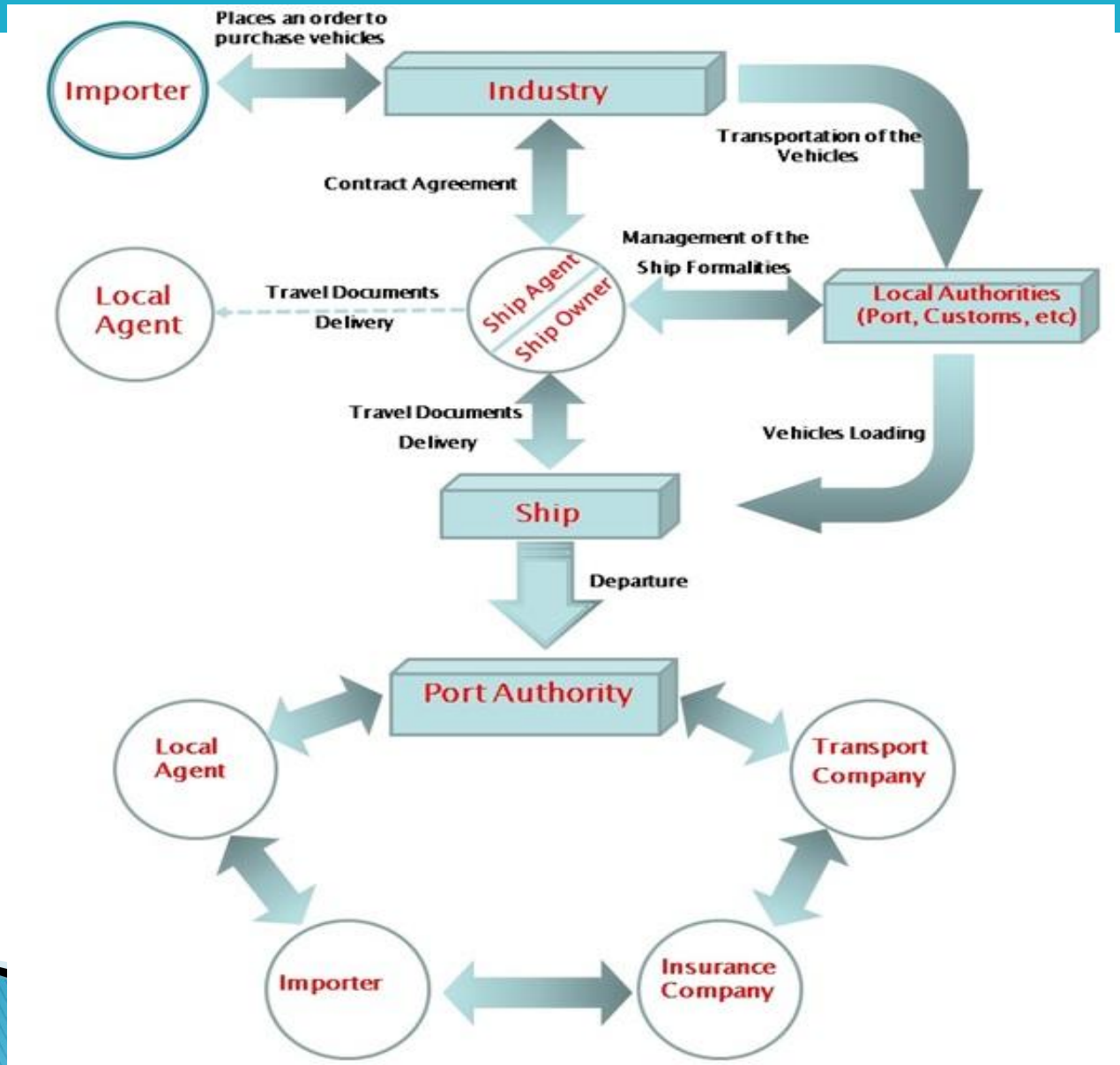
CYSM COLLABORATIVE CYBER/PHYSICAL SECURITY MANAGEMENT SYSTEM

Commercial Ports

Port's Supply Chain Services



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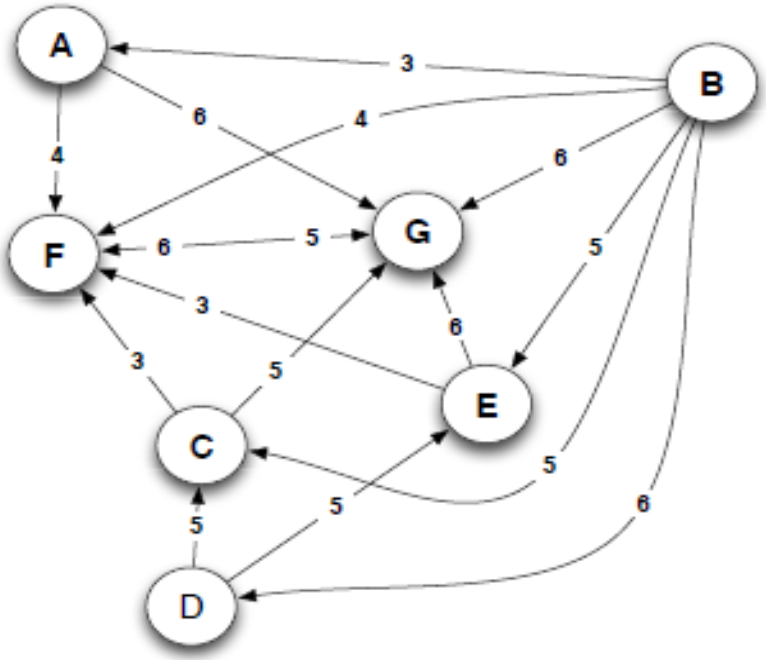
Identifying dependencies: Dependency graphs

Dependent CIs	Dep. Type	Description	SImp	IImp	IImp Type	Scale $I_{j,s}$	LH $L_{j,s}$	Risk $R_{j,s}$
	CI_A (Finance Sector)							
CI_F	C	Provides payment services	UA	UA	Public Confidence	L	L	4
CI_G	C	Provides payment Services	UA	UA	Public Confidence	H	L	6
	CI_B (Energy Sector)							
CI_A	P	Depends for power	UA	UA	Economic Impact	VL	L	3
CI_C	P	Depends for power	UA	UA	Public Confidence	H	VL	5
CI_D	P	Depends for power	UA	UA	Economic Impact	VH	VL	6
CI_E	P	Depends for power	UA	UA	Economic Impact	H	VL	5
CI_F	P	Depends for power	UA	UA	Public Confidence	L	L	4
CI_G	P	Depends for power	UA	UA	Public Confidence	H	L	6
	CI_G (Government Sector)							
CI_F	S	Industrial action	UA	UA	Economic Impact	M	M	6

Dependency. P: Physical, C: Cyber, G: Geographic, Log: Logical, S: Social
Source/Incoming Impact (SImp/IImp). UA: Unavailability, DS: Disclosure, MD: Modification
Scale/Likelihood. VH: Very High, H: High, M: Medium, L: Low, VL: Very Low



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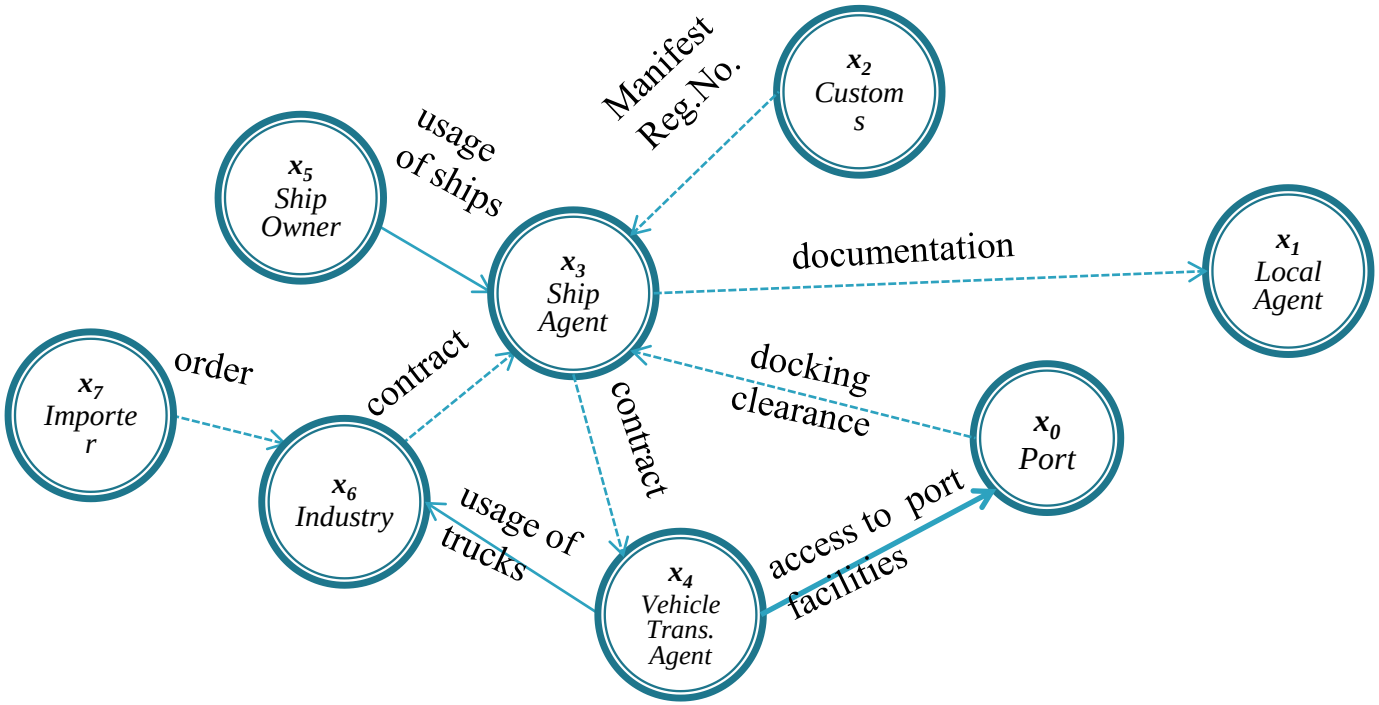
Vehicle Transport Service



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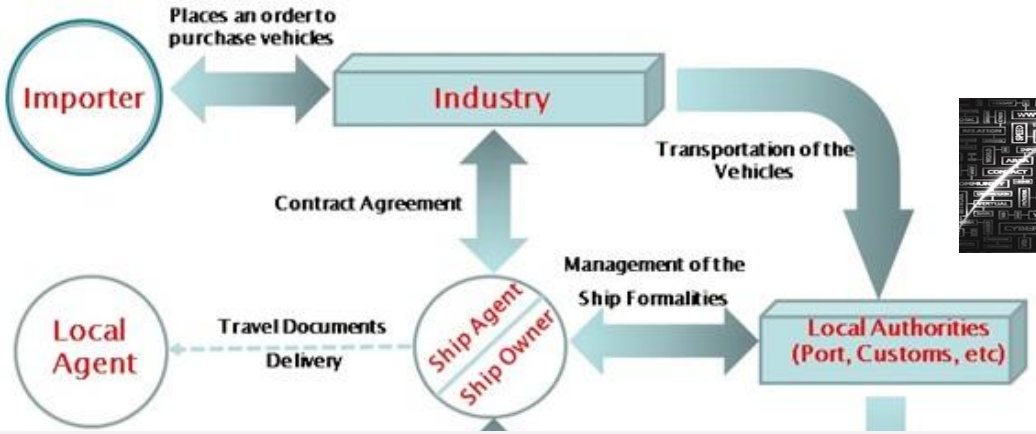
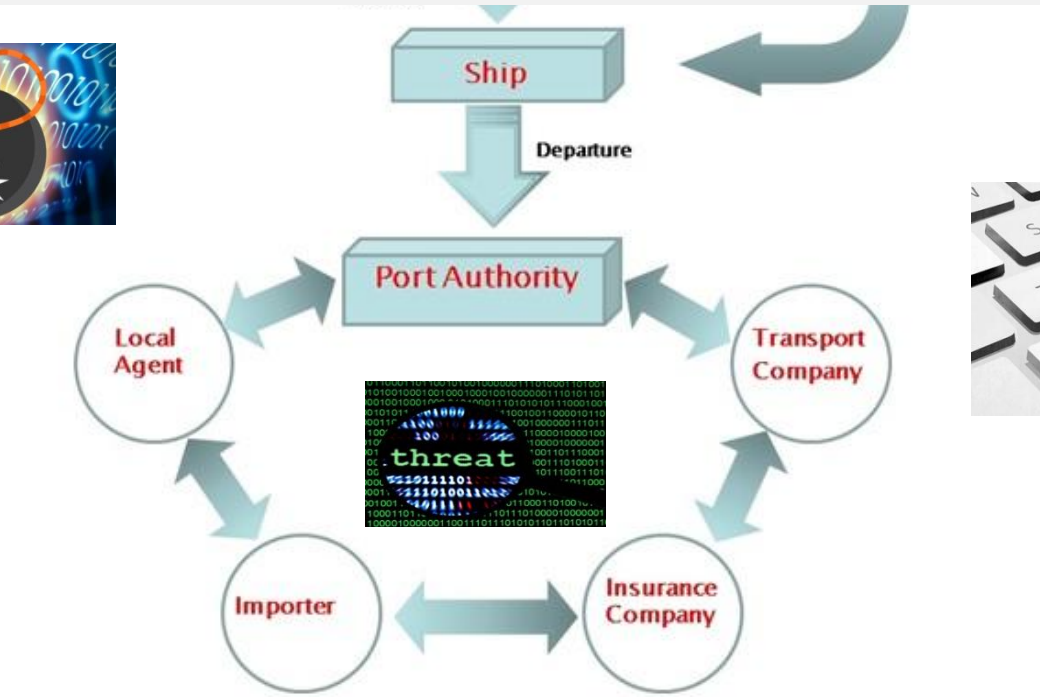
Risks of Port's Supply Chain Services



QUESTION: How can we estimate risks of a supply chain ???



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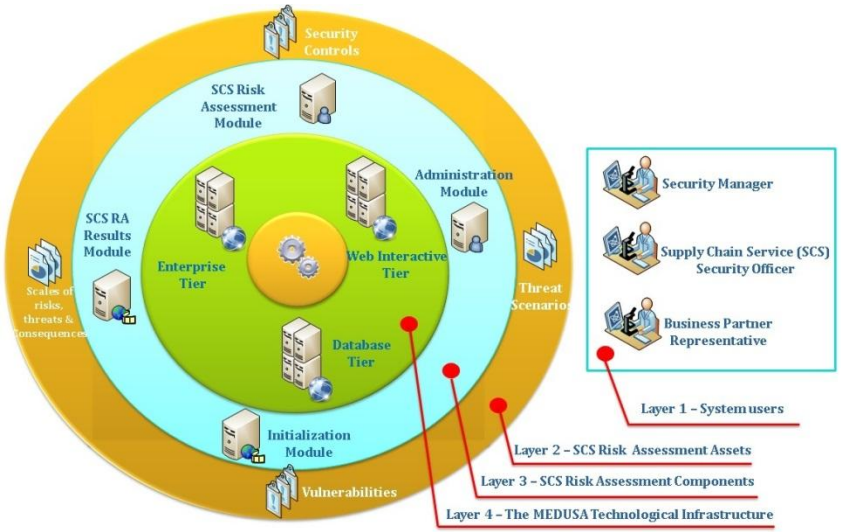
Medusa Objectives (medusa.cs.unipi.gr)

Obj. 1: techniques for capturing multi-order dependencies between port infrastructures and other CIs comprising the global supply chain

Obj. 2: algorithms for identifying and assessing the critical path of the inter-dependencies across the global supply chain

Obj. 3: approach for identifying and analyzing the cascading effects of security incidents on port infrastructures, given their various dependencies.



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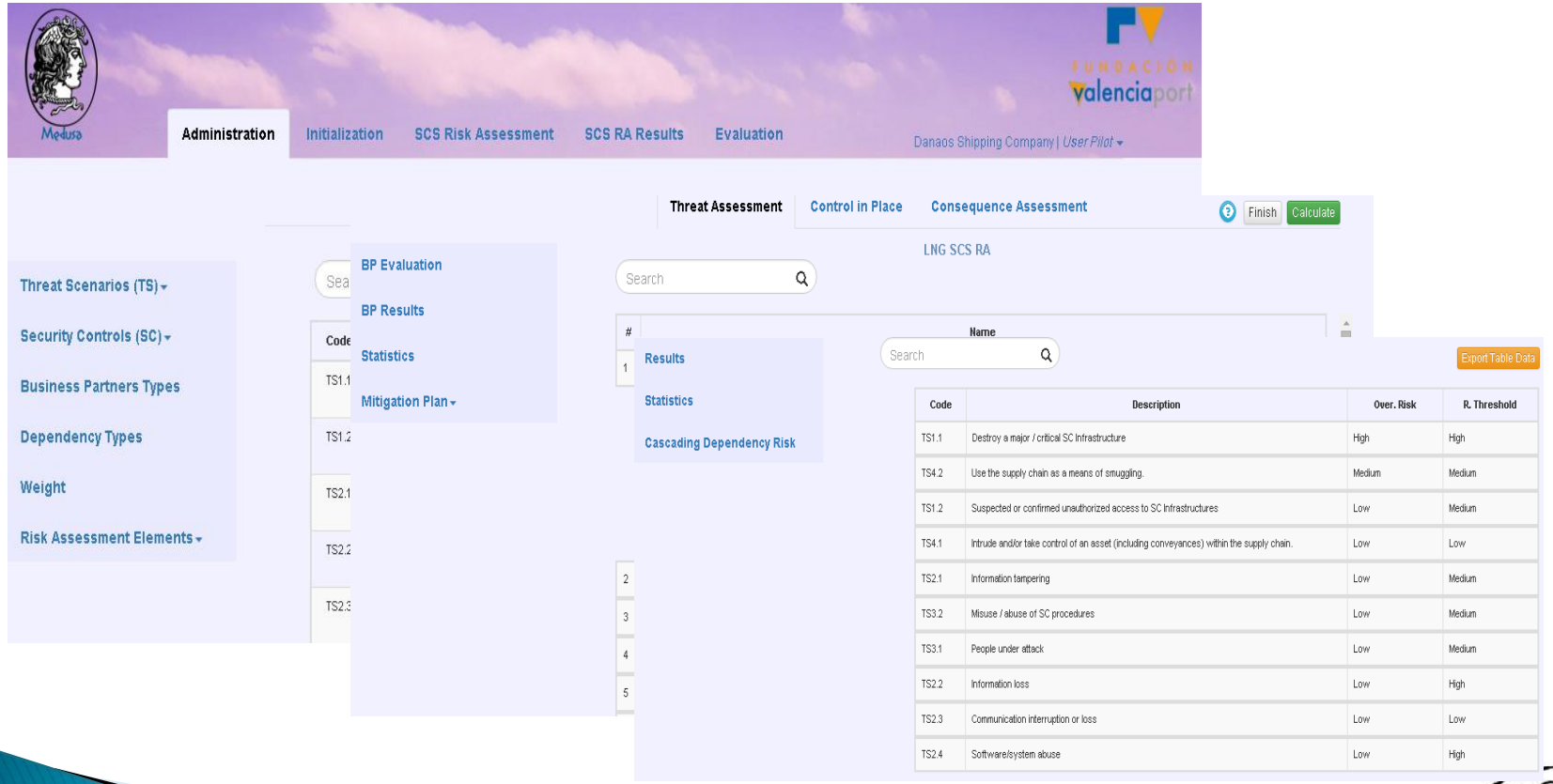
MEDUSA Risk Assessment System

http://medusascsra.cs.unipi.gr



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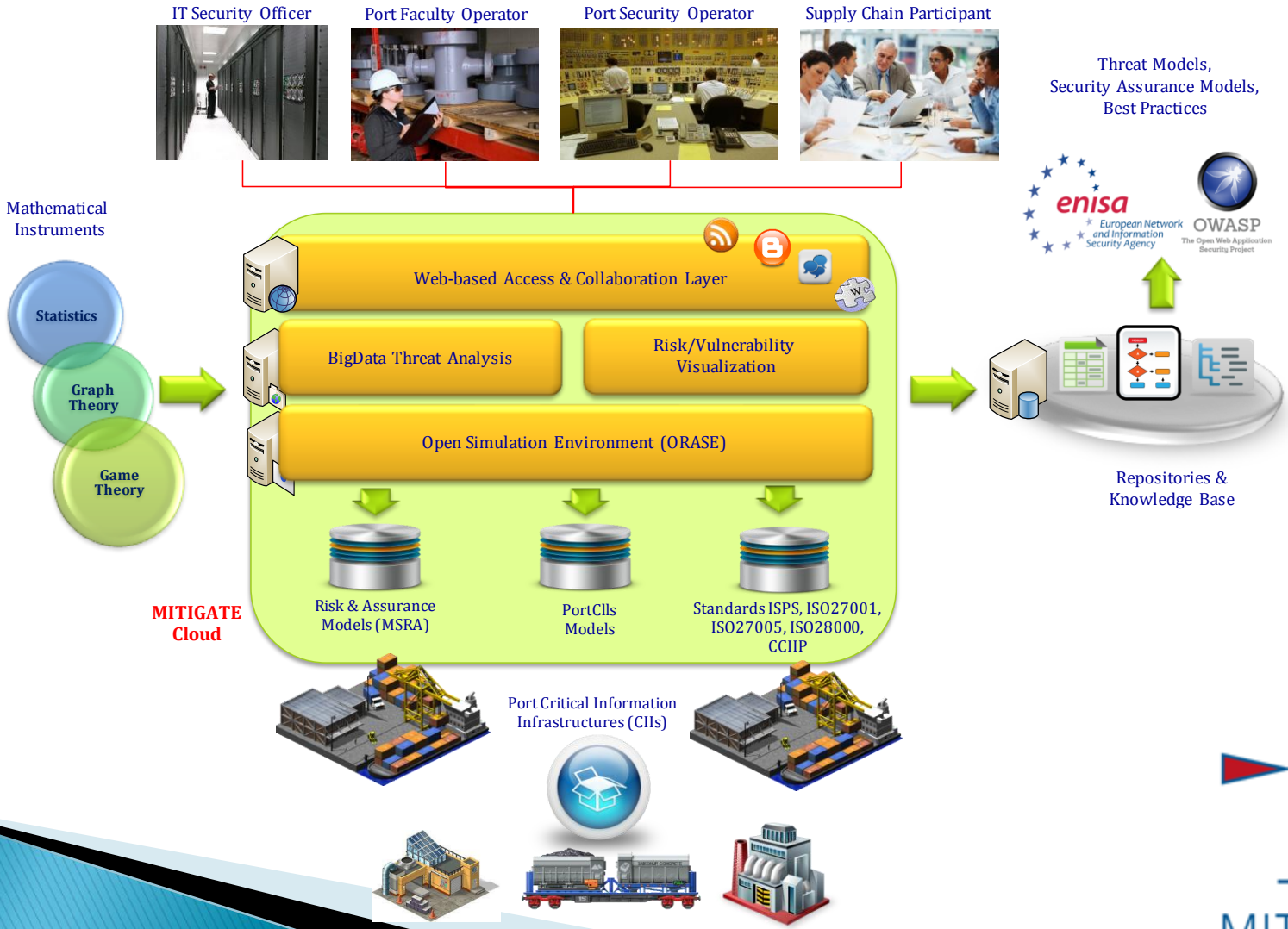
MITIGATE Objectives (mitigateproject.eu)

Goal of MITIGATE is to realize a **radical shift** in risk management methodologies for the maritime sector towards a ***dynamic* evidence-driven Maritime Supply Chain Risk Assessment (g-MSRA)** approach that alleviates the limitations of state-of-the-art risk management frameworks.

The project will develop an effective, collaborative, standards-based **Risk Management (RM) system** for port's CIIs, which shall consider all threats arising from the **global supply chain**, including threats associated with portCIIs **interdependencies** and associated **cascading effects**.

MITIGATE

Mitigate: Maritime SC Dynamic Risk Assessment



MITIGATE

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FUNDACIÓN valenciaport

dbh Logistics IT AG

PORT OF RAVENNA AUTHORITY

Autorità portuale Livorno

Hansestadt Bremisches Hafenamt

MITIGATE

Multi Order Dependency approaches for managing cascading effects in ports' global supply chain and their integration in risk assesment frameworks

Medusa Website
medusas.cs.unipi.gr

MITIGATE Website
www.mitigateproject.eu

CYSM Website
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medusascsra.cs.unipi.gr

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Thank You