

# EUROPEAN COMMISSION

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THEME Monitoring and tracking of shipping containers  
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## **Cassandra** **Common assessment and analysis of risk in global supply chains**

<b>Deliverable No.</b>	D7.7 – Cassandra	
<b>Deliverable Title</b>	Cassandra – D7.7 - Final – Final version of the serious game	
<b>Dissemination level</b>	PU	
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## 1 Declaration

This document declares that we have developed a final, fully digital version of the CASSANDRA serious game, entitled The Chain Game.

The Chain Game is a board game supported by evaluation software. The focus of the game is on different interventions in supply chains in order to improve visibility and security. In detail, each player has to fulfil the role of one of the following supply chain actors: seller, buyer or freight forwarder. The players have to choose interventions to help mitigate risks and improve supply chain visibility and security. In detail, some interventions are beneficial for one actor solely and other measures are beneficial for the whole supply chain. During the game the players have to discuss which interventions they would like to implement. According to their decision, KPIs for each actor and the whole supply chain are calculated. In addition, by using action cards, different events occur during play, which also affect the KPIs. In detail, the KPIs describe the capability, reliability and integrity of each player and the whole supply chain.

Below a screenshot of the playing board.



Figure 1. The game board with three digitized chain intervention cards

The differences between the first and final versions of the game are:

1. Addition of new incident (including announcement of incident): Drugs smuggle (including KPIs and mitigating interventions).
2. Addition of chain mitigation incidents. These two incidents (drugs smuggle and ocean transportation delay due to strike) are mitigated by a high chain value:
  - **'Mitigate drugs smuggle if Integrity is greater than 2** - If the KPI Integrity is greater than 2, this incident will be mitigated because of the strength of the chain. Normally the integrity of the whole chain drops and customs will enlarge his inspections due to the discovery of drugs smuggle. But because of

*the high level of integrity of the chain, customs assumes that it is an incident instead of a structural problem. Therefore this incident has fewer consequences.'*

- **'Mitigate Delay Due to Strike if KPI Reliability greater than 2** - *If the KPI reliability is greater than 2, this incident will be mitigated because of the strength of the chain. Normally the reliability of the whole chain drops because shipments can't be delivered, because Plastic Fantastic runs out of stock and no Illuminanas can be produced. But the operational processes of the chain are good and therefore consequences are limited.'*
3. Addition of chain incident. From the evaluation of the map, we found that the AEO certificate was unclear. Participants indicated that they suspected that if everyone were to obtain an AEO, the chain level would increase. This was not the case, however, because AEO certificates are an individual measure and not a chain measure. In order to process the feedback we developed a new intervention related to the AEO certificate:

**'Collective Application for AEO Certificates** - *Each players applies for the status of Authorised Economic Operator (AEO) to Customs. An AEO certificate provides you all kinds of advantages in international trade, such as fewer controls and priority if your company is selected to be checked. Customs also provides different physical facilities at customs controls to companies with AEO status. By buying this chain intervention the players simultaneously obtain their individual AEO certificates.'*

4. We included an additional individual intervention "Internal improvement program", including effects on the players' KPIs.
5. We included an additional chain intervention and the effects on the players' KPIs: "Initiate chain synchronization program". The intervention cards (both individual and for the chain) and incident cards have been digitized, making the interface of The Chain Game fully digital. Instead of being printed, the intervention cards are now presented to the players through a player console on a tablet (for the individual cards, see Figure 2) or on the touch table (for the chain intervention cards, see Figure 1). The incident cards are presented to the facilitator through a facilitator console on a tablet (see Figure 3). Both the tablets and the touch table run on the Windows 8 operating system.
6. The concept of 'stock price' has been introduced for each player, which is an aggregation of that players KPIs. Additionally, players can transfer a percentage of their stock price to another player as part of a deal, adding a game mechanic that increases player interaction.
7. A feedback loop has been added from the KPIs of the chain to the KPIs of each player, making the stock price of each player dependent on the progress of the entire chain. Additionally, the KPIs of the chain are now not only based on the average performance of each player, but also on the player that performs the worst (the 'weakest link'). These changes create more robust relations between the KPIs of the different players of the game. In practice, it means that the performance of a player is strongly influenced by the performance of the entire chain, in other words, the other players. In order to perform well individually, players need to cooperate and invest in

the performance of the chain. A more detailed description of the game model can be found in the game specification document (D7.8).

- Logging functionality has been added to the game computer model. A history of each change in the game progress (e.g. an intervention, an incidents) and the game state is saved in a table (see Figure 4). This information can be used to visualize the progress for the player or the game facilitator. An example of such a visualization is in Figure 5.

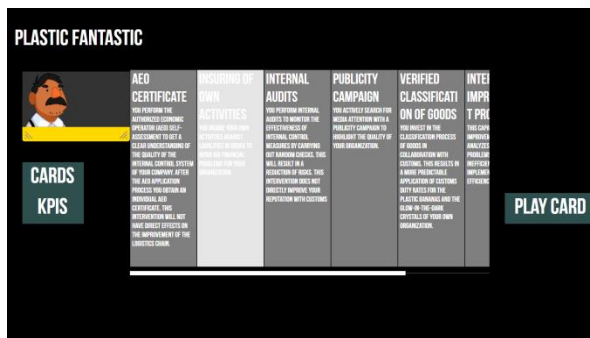


Figure 2. The player console with the digitized individual intervention cards



Figure 3. The facilitator console with the digitized incident cards

Round	Action	Description	Player(s)	Receiver	Amount	Effect description	TTL	Token?	Plastic	Plastic	Plastic	Chemico	Chemico	Chemico	Baharat	Baharat	Baharat	Eureka	Eureka	Eureka	Mutana	Mutana	Mutana
									C	R	I	C	R	I	C	R	I	C	R	I	C	R	I
	<init>	(Initial State)					1		5,00	3,00	1,00	1,00	5,00	3,00	3,00	5,00	1,00	5,00	1,00	3,00	3,00	1,00	5,00
1	2	Insuring of Own Activities	Eureka				1		5,00	3,00	1,00	1,00	5,00	3,00	3,00	5,00	1,00	6,00	1,00	3,00	3,00	1,00	5,00
1	4	Publicity Campaign	Mutana				1		5,00	3,00	1,00	1,00	5,00	3,00	3,00	5,00	1,00	6,00	1,00	3,00	4,00	1,00	5,00
1	5	Outsourcing of Declaration	Baharat				1		5,00	3,00	1,00	1,00	5,00	3,00	4,00	5,00	1,00	6,00	1,00	3,00	4,00	1,00	5,00
1	4	Publicity Campaign	Plastic				1		6,00	3,00	1,00	1,00	5,00	3,00	4,00	5,00	1,00	6,00	1,00	3,00	4,00	1,00	5,00
1	3	Internal Audits	Chemico				1		6,00	3,00	1,00	1,00	5,00	3,00	4,00	5,00	1,00	6,00	1,00	3,00	4,00	1,00	5,00
1	X2	Dividend Pay Out	Plastic	Baharat	1,0%		1		6,00	3,00	1,00	1,00	6,00	3,00	4,00	5,00	1,00	6,00	1,00	3,00	4,00	1,00	5,00
1	X2	Dividend Pay Out	Mutana	Plastic	1,0%		1		6,00	3,00	1,00	1,00	6,00	3,00	4,00	5,00	1,00	6,00	1,00	3,00	4,00	1,00	5,00
1	X1	Inspection by Customs					1		6,00	3,00	1,00	1,00	6,00	3,00	4,00	4,00	1,00	6,00	0,00	3,00	4,00	0,00	5,00
1	B1	Increase of Cargo Theft Truck Carriers					1		6,00	3,00	1,00	1,00	6,00	3,00	4,00	4,00	0,00	6,00	0,00	2,00	4,00	0,00	5,00
2	19	Container Security Devices	Plastic,Baharat,Eureka				1		5,00	4,00	2,00	0,00	7,00	4,00	3,00	5,00	2,00	5,00	1,00	4,00	3,00	2,00	7,00
2	2	Insuring of Own Activities	Mutana				1		5,00	4,00	2,00	0,00	7,00	4,00	3,00	5,00	2,00	5,00	1,00	4,00	4,00	2,00	7,00
2	2	Insuring of Own Activities	Chemico				1		5,00	4,00	2,00	0,00	7,00	4,00	3,00	5,00	2,00	5,00	1,00	4,00	4,00	2,00	7,00
2	X2	Dividend Pay Out	Eureka	Baharat	2,0%		1		5,00	4,00	2,00	1,00	7,00	4,00	3,00	5,00	2,00	5,00	1,00	4,00	4,00	2,00	7,00
2	B2	Cargo Theft				*Mitigation by: 19*	1		5,00	4,00	2,00	0,75	7,00	4,00	2,75	4,75	2,00	4,75	0,75	4,00	4,00	1,50	7,00
3	11	Preferred Partner Selection	Plastic,Chemico,Eureka,Mutana				1		7,00	4,00	4,00	2,75	7,00	6,00	2,75	4,75	2,00	2,75	2,75	4,00	4,00	1,50	9,00
3	2	Insuring of Own Activities	Baharat				1		7,00	4,00	4,00	2,75	7,00	6,00	3,75	4,75	2,00	2,75	2,75	4,00	4,00	1,50	9,00
3	X2	Dividend Pay Out	Plastic	Eureka	2,0%		1		7,00	4,00	4,00	2,75	7,00	6,00	3,75	4,75	2,00	2,75	2,75	4,00	4,00	1,50	9,00
3	X1	Inspection by Customs					1		7,00	4,00	4,00	2,75	7,00	6,00	3,75	3,75	2,00	2,75	1,75	4,00	4,00	0,00	9,00
3	A1	Chance of Freight Delay					1		7,00	4,00	3,00	2,75	7,00	6,00	3,75	3,75	2,00	2,75	1,75	4,00	4,00	0,00	9,00
4	21	Data Pipeline and Business Dashboard	Plastic,Chemico,Baharat,Eureka,Mutana				2		6,00	6,00	4,00	1,75	9,00	7,00	4,75	4,75	3,00	3,75	2,75	5,00	6,00	2,00	10,00
4	1	AEO Certificate	Mutana				2		6,00	6,00	4,00	1,75	9,00	7,00	4,75	4,75	3,00	3,75	2,75	5,00	6,00	2,00	10,00
4	X2	Dividend Pay Out	Mutana	Eureka	1,0%		2		6,00	6,00	4,00	1,75	9,00	7,00	4,75	4,75	3,00	3,75	2,75	5,00	6,00	2,00	10,00
4	X1	Inspection by Customs					2		6,00	6,00	4,00	1,75	9,00	7,00	4,75	3,75	3,00	3,75	1,75	5,00	6,00	0,00	10,00

Figure 4. History of a game in progress

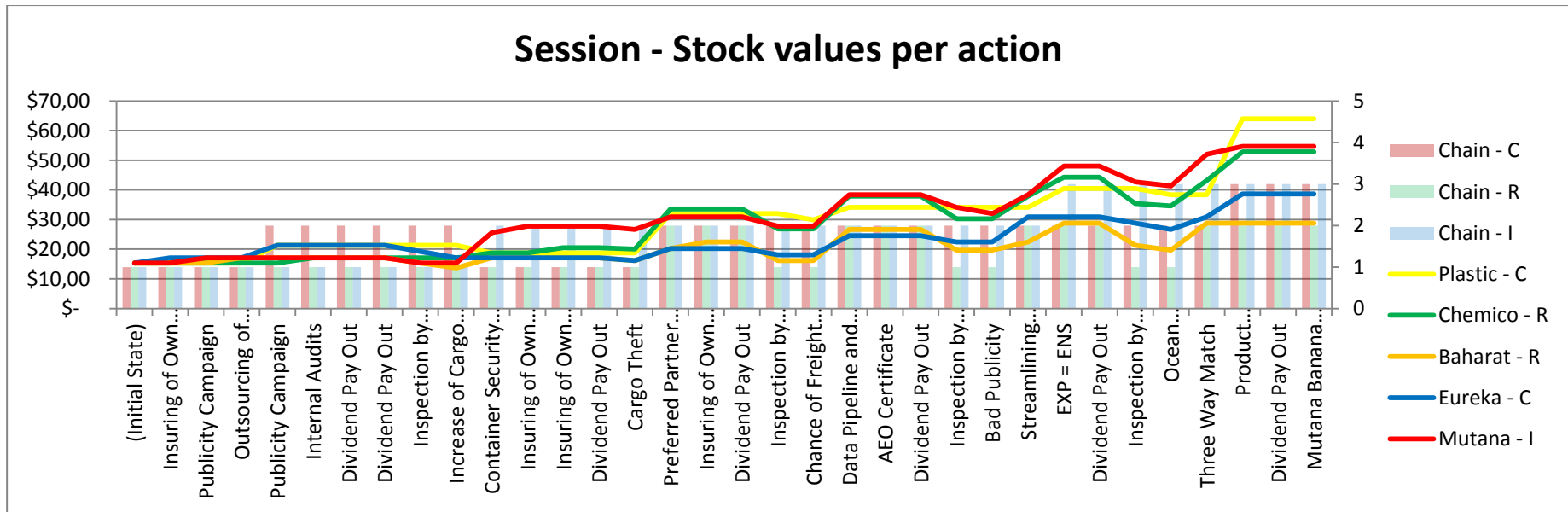


Figure 5. Visualization of game progress

## 2 Disclaimer and acknowledgement

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### 2.3 Acknowledgement

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