VORISOMA

- VORISOMA 2.0 is a set of tools to assist in Criminal Networks Analysis.

- A criminal network model can be elaborated in isolated or collaborative workspaces; the user with the administrator role defines levels of access for each team member.

- A new account/instance of VORISOMA is created for each customer in an isolated server. This means that the models and the data used by each customer are isolated and untraceable by other customers.
  - Each customer can activate an unlimited number of workspaces for elaborating criminal network models, and an unlimited number of members can collaborate according to each team's requirements.
  - Larger teams will require better and more robust servers.

- VORISOMA allows generating and managing the databases of interactions that sustain a criminal network model/graph by:
  - Importing CSV files with structured data.
  - Applying our Artificial Intelligence trained to extract entities such as (i) companies and organizations, (ii) individuals, and (iii) countries from natural language text.
  - Manually creating nodes and interactions.
  - Importing data from other workspaces.

- VORISOMA automatically generates Criminal Network Graphs (CNGs) and calculates centrality indicators such as degree and betweenness in real-time as data is added to a workspace.

Creating nodes and interactions manually

Add elements
- ⚙ Actor
- ⚙ Relationship
- ⚙ Relationship Type
- ⚙ Case
- ⚙ Case Actor
- ⚙ Workspace
- ⚙ Content Page
- ⚙ New profile

1. Add elements: actor.

   ⚙ Actor

   The user creates every node defining characteristics such as (i) name, (ii) actor type, (iii) default operation country, and (iv) gender.

2. Add elements: relationships.

   ⚙ Relationship

   The user creates every interaction defining characteristics such as (i) the emitter and the receiver node, (ii) the relationship type, (iii) the interaction date, (iv) empirical evidence, and (v) transnational movement of 8 types of resources.

3. Add elements - Content page.

   ⚙ Content Pages

   Content management for maintaining content pages.

4. Add elements - Relationship type.

   ⚙ Relationship Type

   The user manually creates a type of interaction. It also can be added while creating a relationship.

5. Add elements – Workspace.

Workspace

The user administrator creates and sets up a workspace.

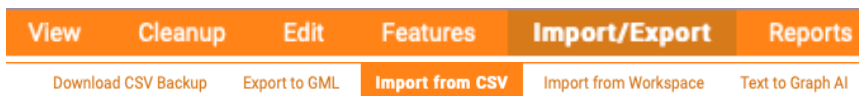6. Add elements – Case.

Case

The user manually creates a case and its characteristics.

7. Add elements - Case actor.

Case Actor

The user manually specifies an actor mentioned in a judicial case.

Importing structured data in CSV files

8. The user imports structured data from CSV files.

Import from CSV

VORISOMA generates network graphs by importing structured data arranged in CSV files.

9. The user defines the data columns that will be used when importing CSV files.

The user defines columns for mapping (i) emitter/active and receiver/passive actor/nodes, (ii) names of those nodes, (iii) interactions, and (iv) types of interactions. Users can also merge and combine data from columns, define joiners between data from different columns, and define fixed characters that weren't initially in the structured data source.

10. The user saves a configuration of data columns as a preset to be applied when importing new CSV files.

Importing sources from other workspaces

11. The user imports data from another workspace available in his/her instance.

    Import from Workspace

    Only new elements are imported. This feature imports Actors, Relationships, Profiles, Actor Types, and Relationship Types.

Exporting workspaces

12. The user exports a workspace.

    Export to GML

    The following formats can be used: (i) GML (Graph Modeling Language), (ii) CSV in denormalized columns (compatible with CSV import), and (iii) CSV backup.

Generating A Criminal Network Graph (CNG) from Natural Language Text

13. Text to graph AI.

    Text to Graph AI

    VORISOMA reads a text and identifies and extracts interactions between individuals and organizations.

    a. An unfiltered "Text to graph AI" importing mode allows graphs to be generated by turning any semantic entity -such as places, dates, and objects- into nodes in a network graph. In this case, VORISOMA not only extracts individuals, companies, and countries but also any other semantic entity.

       Entities to extract: All Sematic Entities | Actors and Countries

    b. VORISOMA assigns to each interaction the piece of text that was used as empirical evidence to create nodes and interactions.

    c. The user can edit nodes, interactions, and empirical evidence assigned to each interaction modeled by VORISOMA.

Navigating Criminal Network Graphs in 2D

14. View

View	Cleanup	Edit	Features	Import/Export	Reports

The user sees the Interactive/Animated force-based visualization graph automatically generated with the data available in the workspace.

15. The user navigates the network as a graph or as a list of nodes.

16. The user zooms in and zooms out.

17. The user views the network graph in full screen.
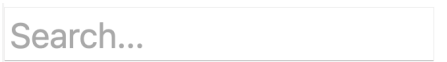
18. The user sees a complete network graph visualization.

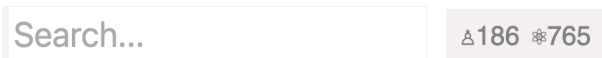19. The user activates and deactivates the labels of the nodes.

20. VORISOMA applies automatic clustered visualization of disconnected nodes and pairs of nodes.

21. The user searches nodes within a network graph.

Search...

22. VORISOMA shows the number of nodes and interactions in a network graph.

| Search... | ⚠186 ❋765 |

23. The user navigates the neighborhood of a single node.
    a. Clicking on a single node allows navigating and analyzing its immediate neighborhood, grades of separation with surrounding nodes, and expansion of routes/paths.
    b. The user selects the grades of separation to analyze a single node's structure.

| Distance/Actors | | 1 | 6 | 2 | 22 | 3 | 44 | 4 | 78 | 5 | 152 | 6 | 160 | 7 | 164 | D | 195 |

    c. The user clicks on nodes with a yellow dot to expand the routes within a single node's network.
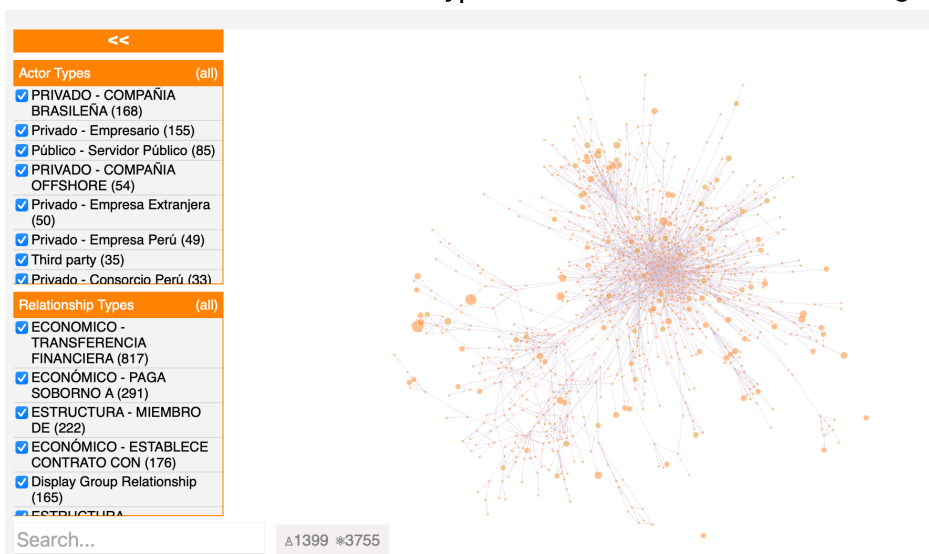
    🔍 Supreme Court

24. Icons.

⚠10429 ❋25177 ☐ Icons

The user assigns icons to specific types of nodes. Then, the user can activate and deactivate the visualization of icons.
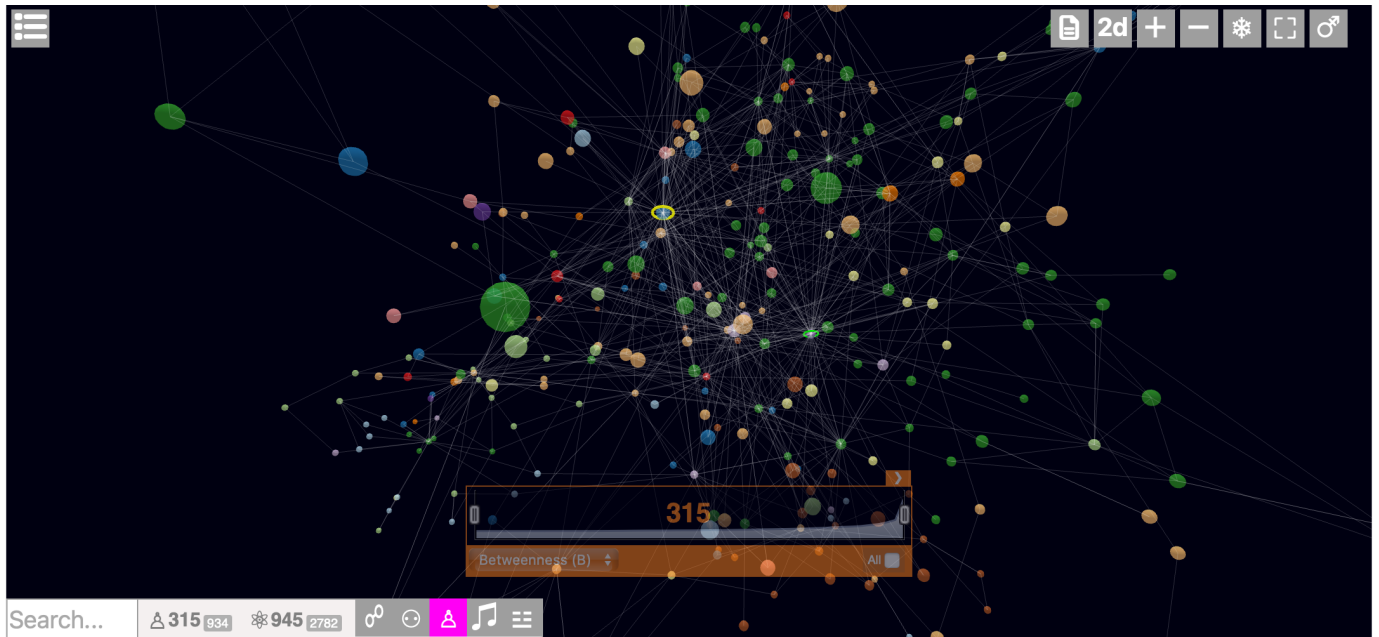
25. The user activates and deactivates types of actors and interactions during navigation.

The user activates and deactivates types of nodes/actors and types of interactions during navigation to verify how relevant those types are in the network's structure.

Navigating Criminal Network Graphs in 3D

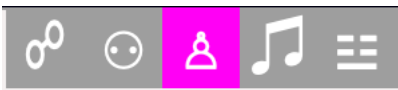26. The user navigates Criminal Network Graphs in 3D.

27. The user activates and deactivates the view of isolated nodes.

28. The user activates and deactivates the clusterization of nodes around a single node.
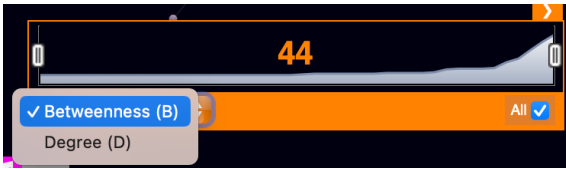

29. The user activates and deactivates the anonymization of nodes.

30. The user activates and deactivates sounds when rolling over nodes and interactions.
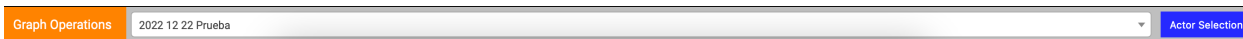
31. The user selects if navigating the Criminal Network Graph (CNG) according to the betweenness or the Degree indicators.
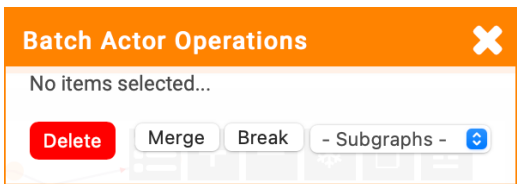

32. The user selects the number of nodes to appear in the CNG according to the selected centrality indicator.
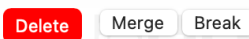

Node Operations (Lower Bar)

33. The user clicks on "Actor Selection" to activate the selection of nodes (+) and graph operations.

34. The user selects nodes for operations by clicking on them when the pointer shows "+".
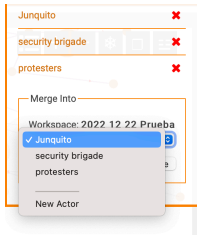

35. Delete.

The user deletes nodes during graph navigation.

36. Merge.

The user merges two nodes into an already created node or into a new one.

37. Break.

The user unmerges clusters (groups of isolated nodes).

38. Subgraphs.
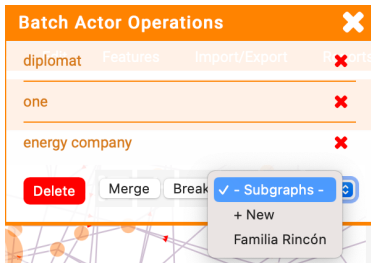
a. The user selects nodes during the navigation by clicking on the node when the pointer shows "+".
b. After selecting the nodes, the user can add the nodes to an already-existing subgraph, or to a new one.

b. The subnetworks can be found, selected, and navigated in the subnetworks section.

39. Clean up - Remove unused items.
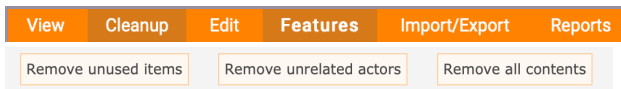
In a workspace, the user removes actor types and relationship types not assigned to any actor/relationship (unused).

40. Clean up - Remove unrelated actors.

Remove unused items	Remove unrelated actors	Remove all contents

The user removes all disconnected nodes.

41. Clean up - Remove all content.

View	Cleanup	Edit	**Features**	Import/Export	Reports

Remove unused items	Remove unrelated actors	Remove all contents

The user removes all the content in a workspace.
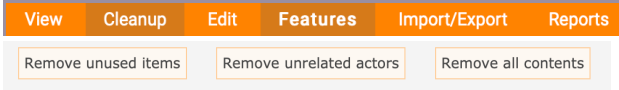
Edit Workspaces

View	Cleanup	**Edit**	Features	Import/Export	Reports

42. Title.

Title *
2022 12 22 Prueba
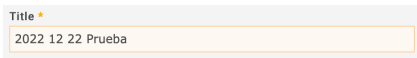
The user defines or modifies the workspace's name.

43. Privacy.

Privacy *
■ Keep the contents of this workspace for it's exclusive use
☐ Make the contents of this workspace accessible from all workspaces
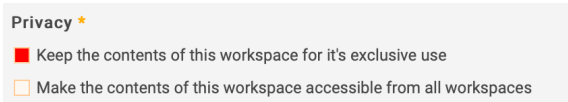
The user defines if the workspace's content is kept isolated or shared with other workspaces.

44. Users.

The administrator assigns users to the workspace that is being edited.

45. Publishing options.

Publishing options
Not published   ☐ Published
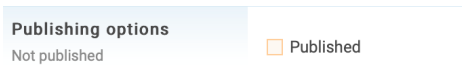
The user defines if the network graph will be published in the public Criminal Aura Graph.

Features

46. Actor types.

| Actor Types | Actors | Cases | Countries | Relationship Types | Relationships | Subgraphs | Type Structure |

The user defines categories of nodes.

47. Actors.

| Actor Types | Actors | Cases | Countries | Relationship Types | Relationships | Subgraphs | Type Structure |

VORISOMA shows the list of all the nodes in a workspace and shows alerts of disconnected nodes.

48. Cases.

| Actor Types | Actors | Cases | Countries | Relationship Types | Relationships | Subgraphs | Type Structure |
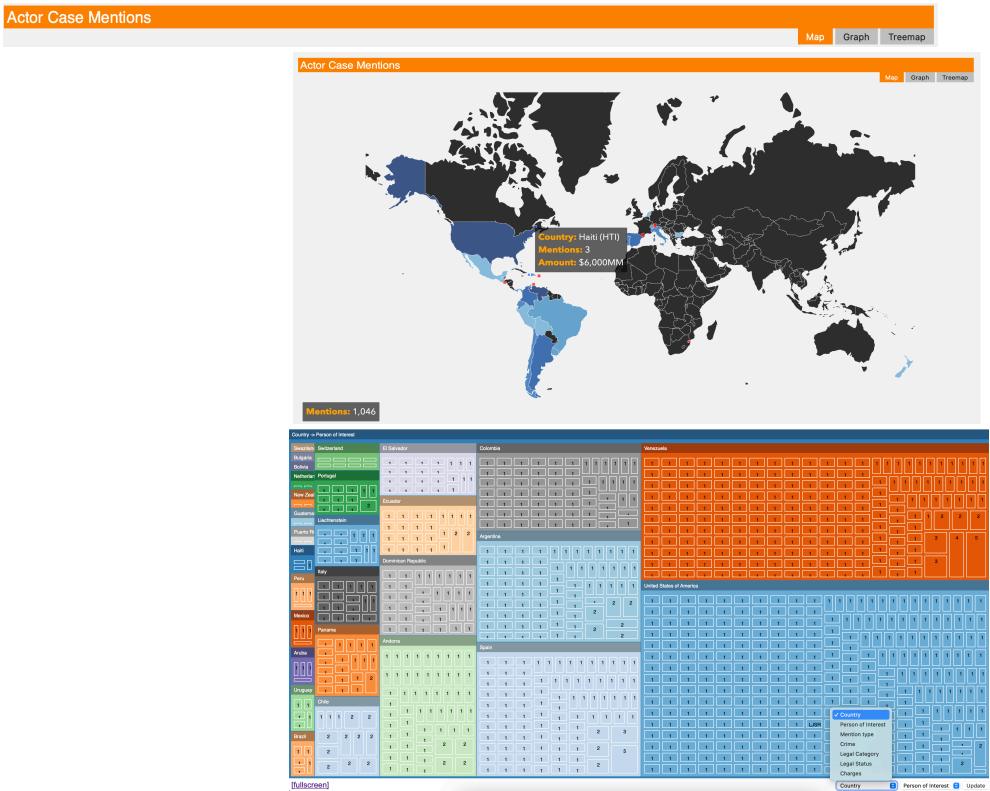
Dashboard with World Map, Network Graph, and Treemap to show information of judicial cases worldwide.

49. Countries.

c. VORISOMA shows a private Criminal Aura Graph with the transnational interactions of the workspace.

d. VORISOMA searches and proposes a default country for every node. The number of nodes in which VORISOMA successfully identifies a country appears in the private Criminal Aura Graph.

Actors	10759	Relationships	26192	Actors with Country	7819	Country Count	147	Relationships with Country	4293

e. VORISOMA shows the default country of every node/actor, manually defined by the user or by VORISOMA AI.

50. Relationship types.

Actor Types   Actors   Cases   Countries   **Relationship Types**   Relationships   Subgraphs   Type Structure

The user sees all the types of relationships used in the workspace.

51. Relationships.

Actor Types   Actors   Cases   Countries   Relationship Types   **Relationships**   Subgraphs   Type Structure
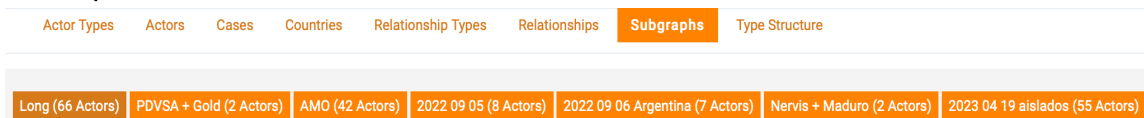
The dashboard with the "Relationship table" is the complete list of all the interactions modeled in the workspace and the graph.

VORISOMA shows all the interactions that form a network by listing the following information for each interaction: (i) Relationship type, (ii) emitter/active node, (iii) receptor/passive node, (iv) confidence level of the interaction, (v) assigned date, (vi) empirical evidence, and (vii) assigned system ID.

Relationship Type	AC1	AC2	Confidence	Assigned Date	Evidence	ID
Hechos de corrupcion	• Actor: Rafael Darío Ramírez Carreño	Actor: Petróleos de Venezuela S.A. (PDVSA)	Medio de comunicación reconocido (confiable)		Irregularidades en la compra de alimentos. Para el periodo noviembre 2007 – julio 2008, La filial de PDVSA, Bariven compró y pagó 1.057. 531 TM de alimentos por un precio de 2.248 millones de dólares. Sin embargo para octubre de 2008 en Venezuela sólo se habían recibido 266.Para el año 2008, no se consideraron las mejores ofertas , registrándose una pérdida de 54 millones de dólares. Se encontraron 65 contenedores con alimentos dañados.Se encontraron diferencias en los controles de recepción de la mercancía.	175406

52. Subgraphs.

| Actor Types | Actors | Cases | Countries | Relationship Types | Relationships | **Subgraphs** | Type Structure |

| Long (66 Actors) | PDVSA + Gold (2 Actors) | AMO (42 Actors) | 2022 09 05 (8 Actors) | 2022 09 06 Argentina (7 Actors) | Nervis + Maduro (2 Actors) | 2023 04 19 aislados (55 Actors) |

    a.   Shows a tab for each generated subnetwork with its characteristics. (ii) The user selects a subnetwork for analysis.

    b.   Subgraphs - Click on a subnetwork: Allows full navigation of each subnetwork.

53. Subgraphs – Paths as nodes.

Paths as Nodes ⇕   **Update**
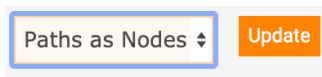
If selected, VORISOMA shows the degrees of separation in each route as a node. The routes are, therefore, collapsed to show a shorter graph.

54. Subgraphs – Exposed paths.

Exposed Paths ⇕   **Update**

If selected, VORISOMA shows all the intervening nodes in each route of the subnetwork. A bigger graph is shown.

55. Subgraphs – Centrality.

VORISOMA calculates and shows the direct centrality and the betweenness indicators for the subnetwork's nodes.

56. Type structure.

| Actor Types | Actors | Cases | Countries | Relationship Types | Relationships | Subgraphs | **Type Structure** |

If categories for nodes and interactions have been correctly applied with this option, VORISOMA shows a structural graph in which each category appears as a node. This graph reveals the structural nature of the network.

57. Reports.

| View | Cleanup | Edit | Features | Import/Export | **Reports** |

a. VORISOMA generates statistics and pies describing the network's statistical characteristics regarding its categories.

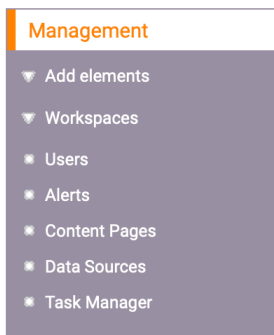b. Allows applying filters to explore statistics of specific values that VORISOMA finds in the network.

| Cantidad de Relaciones 🔍 |
| Cantidad de Actores 🔍 |
| Cantidad de Menciones en Casos 🔍 |
| Cantidad de Casos 🔍 |

58. Relationship Statistics.

Accumulated Confidence Matrix   Conection Matrix   Count Matrix   Relationship Matrix   **Relationship Statistics**

VORISOMA shows the number of each interaction category.

Other Management Options

Management
- ▼ Add elements
- ▼ Workspaces
- ⬜ Users
- ⬜ Alerts
- ⬜ Content Pages
- ⬜ Data Sources
- ⬜ Task Manager

59. Users:

⬜ **Users**

a. The administrator sees and edits the users assigned to a workspace and defines their roles.

b. Access Control: Granular User / Role-based access control.

60. Alerts.

⬜ **Alerts**

VORISOMA highlights with red the disconnected nodes and the interactions with short evidence.
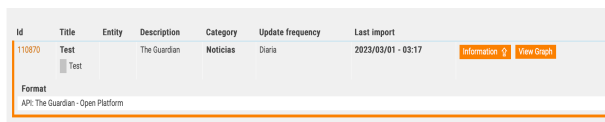
61. Content pages.

⬜ **Content Pages**

The user sees the list of content pages within VORISOMA.

62. Data sources.

The user defines parameters for executing an **ARCON: Automated Robotic Criminal Observation Network**.

63. Task Manager.
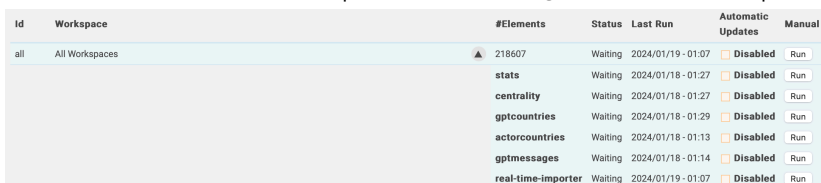

The user controls automatic processes running across the workspaces.

Id	Workspace	#Elements	Status	Last Run	Automatic Updates	Manual
all	All Workspaces	218607	Waiting	2024/01/19 - 01:07	Disabled	Run
	stats		Waiting	2024/01/18 - 01:27	Disabled	Run
	centrality		Waiting	2024/01/18 - 01:27	Disabled	Run
	gptcountries		Waiting	2024/01/18 - 01:29	Disabled	Run
	actorcountries		Waiting	2024/01/18 - 01:13	Disabled	Run
	gptmessages		Waiting	2024/01/18 - 01:14	Disabled	Run
	real-time-importer		Waiting	2024/01/19 - 01:07	Disabled	Run

Workspaces

The administrator sees and edits workspaces and users assigned to each workspace.

64. Actor types.

VORISOMA shows all the actor types for the active workspace.

65. Shared content.

VORISOMA shows the elements (actors, relationship types, and actor types) that can be shared between workspaces.

66. **Resource movement types.**

Resource Movement Types

The user creates and edits categories of resources to be shown in the Criminal Aura Graph.

67. **Resource movement.**

Resource Movements

VORISOMA shows and allows editing the information of the interactions in which the user registered a transnational movement of resources.