Creating, Viewing, and Editing Data in ORA

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Summer Institute 2018

Agenda

Create a blank meta-network
View the nodes, attributes, and networks
Edit, transform, manipulate meta-networks
Creating a meta-network

- Open the Data Import Wizard (File \ Data Import Wizard)

Creating a meta-network...

Step 1. a meta-network has a Name

Step 2: create one or more nodesets. Each one has a Class and a Name (must be unique across nodesets)

Step 3: associate a pair of nodesets to create a network
Creating a meta-network...

We will create a simple meta-network for a company.

First, we add a single employee nodeset of class Agent.

Next, we create a "works with" network that associates employees.

Creating a meta-network...

Next we added another nodeset of skill of class knowledge.

And another network that associates employee and skill.
**Meta-Network Manager**

Lists the meta-networks and the nodesets and networks of each.

Click on a particular nodeset or network to view its details in the right-hand panel.

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**Nodeset Editor**

Click on a nodeset within the Meta-Network Manager
Nodeset Editor...

Lists each node and its attributes (our employees do not have any yet).

Here we have edited the node titles.

Note: Node Names must be unique to the nodeset. Titles are used in reports and visualizations.

Nodeset Editor: Node Actions

Select one or more nodes to the left of their Node Name.

Use the Nodes menu items:

**Delete** deletes the selected nodes.

**Merge** combines the nodes and their associated links.

**Move** nodes to a different nodeset.

**Clean** finds and merges nodes with similar node names.
Nodes can have attributes: Age, Gender, Experience, etc.

Attributes have a data type: Number, text, date

Use the **Attributes \ Create new attribute** menu item and choose Name = Age, Type = Number Category.

Fill in the Attribute column.

Click on the Age column header to sort by attribute value.

Use the down arrow in the column header (circled in red) to filter nodes by age.
Network Editor: Info tab

Click on the **Works With** network in the manager to load the Network Editor.

The Info tab shows high level information.

Network Editor: Info Tab - Network Properties

Use the Network Properties check boxes to make the network:

- Symmetric (undirected)
- Allow self-loops
- Have weighted or binary link values

These options can add or remove links when clicked.
**Network Editor: Info Tab – Network Statistics**

The network statistics section shows the key statistics of the network. These are based on the current links in the network, and are therefore affected by the Network Properties selected.

**Network Editor: Info Tab – When computing measures**

The **When computing measures** section does not add or remove links to the network. Rather, it temporarily transforms the network before computing measures. The options are “temporary” versions of the network properties.
The editor tab shows the links.

We created an empty meta-network, without links.

Make Alan work with all colleagues → check mark his row.

Make everyone work with Alan → check mark his column.

**Network Editor: Transformations**

**Convert Links** has options to transform link values: e.g. adding one to links, taking the log of link values, etc.

**Trim** has options to remove (filter) nodes and links using various criteria.
Network Editor: Creating Links

Click on the employee x skill network as shown.

Create the links shown by clicking on the link’s check box; this makes a link of weight one.

To create weighted networks, use Display Options \ Numeric Link Values.

Network Transformations: Folds

Suppose we ask ourselves: which employees are the most similar in terms of skills?

We could just look at the network and see that Alan and Bob both have 2 skills in common with Earl.

If the network were larger, however, we would not be able to eyeball the solution.
Folding the network answers this question.

Folding means to multiply a network by its transpose, and this adds common links.

Right-click on the employee x skill network and select the Fold network... menu item.

A dialog appears: select the options shown.

Click Fold, and the result is an employee x employee network whose links are the number of skills in common for the employees.
Network Transformations: Folds...

The new, folded network is: employee x employee – Shared Skill

Click the menu: Display Options / Numeric link values.

The diagonal links show the number of skills for the person; off-diagonal links show the number of shared skills between the two employees.

Matrix Algebra

The Matrix Algebra tool is under the Data Management menu.

Use it to create new matrices (networks) from existing ones.

Matrix multiplication has an elegant interpretation in networks.

The example here multiples an Agent x Knowledge network with a Knowledge x Task network.

The resulting Agent x Task network link values are the number of knowledge that an agent has that it uses to complete its tasks.
Meta-Network Transformations

Data Management \ Meta-Network Transform menu displays the following dialog.

Use this to transform all networks in a meta-network at once, and for special processing.
Network Set Operations

- Given a meta-network with multiple networks of the same type: i.e. 3 Agent x Agent networks: friendship, family, co-worker
- The union or intersection of these networks can be computed and a new resulting network created in the meta-network
- Multi-select the networks in the meta-network manager and then right-click to choose Union or Intersect Selected Networks
- Select how to handle the weights of links that exist in more than one network: min, max, sum, binary

This shows how the multiple Agent x Agent networks are selected.

Right-click has been pressed, and the Union and Intersect options are at the bottom of the context menu.
Meta-Network Set Operations

- **Union**
  - Union the nodes together (keeping them in each nodeset)
  - Different ways to combine links

- **Intersect**
  - Intersect the node class nodes
  - Different ways to combine links

- **Difference**
  - Subtract one meta-network from another

- **Conform**
  - Make all node classes have the same nodes
    - Union method: add (isolate) nodes to node classes
    - Intersect method: remove nodes from node classes
  - No networks are added or removed

Load multiple meta-networks.
Or take one and drag it to blank space in the manager, and it will be copied.
Right-click and the context menu (shown) is displayed.
Select Union, Intersect, Conform