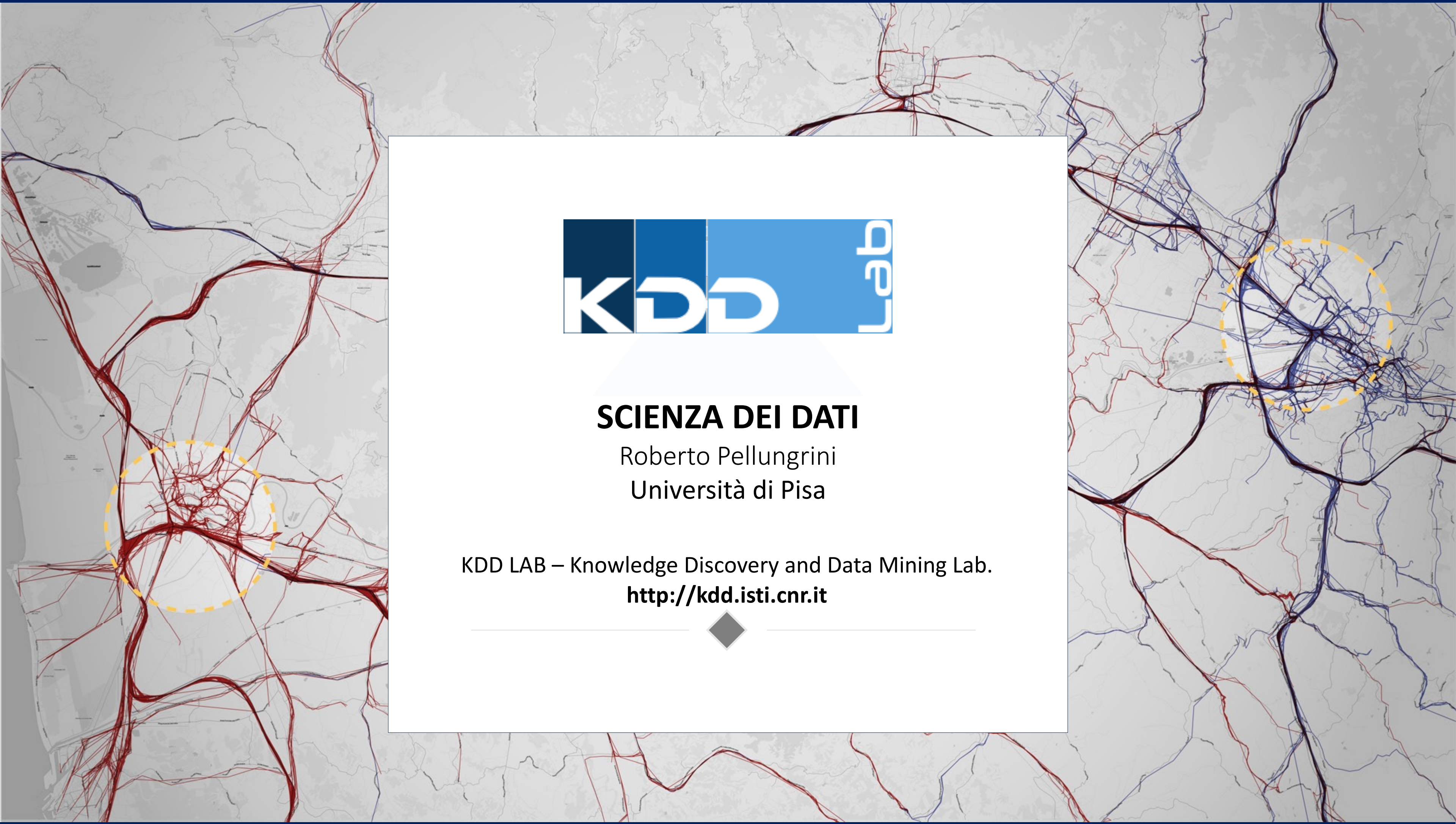


SCIENZA DEI DATI

Roberto Pellungrini
Università di Pisa

KDD LAB – Knowledge Discovery and Data Mining Lab.
http://kdd.isti.cnr.it

Cosa vedremo oggi

- Introduzione a KNIME
- Principali componenti
- Aprire ed esplorare i dati
- Clusterizzazione
- Classificazione

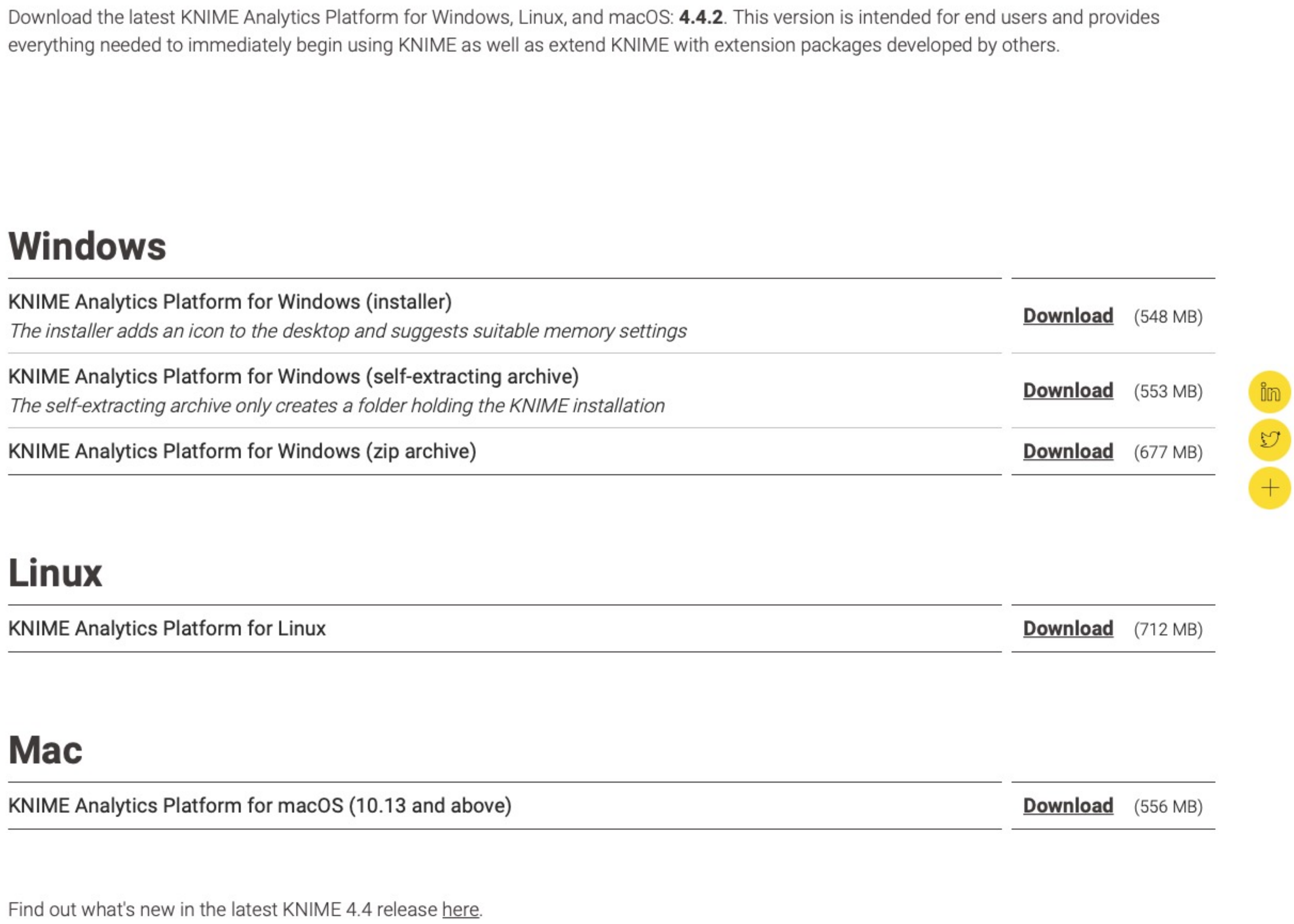
Cosa è KNIME?

- KNIME = Konstanz Information Miner
- Sviluppato inizialmente presso l’università di Konstanz in Germania
- Versione completamete gratuita per desktop
- Piattaforma modulare per la data science basata su **workflows a nodi.**
- Mette a disposizione funzioni standard per **data mining, analisi e manipolazione dei dati**
- Si possono installare varie estensioni per integrare nuove funzionalità

Risorse per KNIME

- Pagina web principale e documentazione
  https://www.knime.com
- Downloads
  https://www.knime.com/downloads/download-knime
- Apprendimento

  https://www.knime.com/learning



Download the latest KNIME Analytics Platform for Windows, Linux, and macOS: **4.4.2**. This version is intended for end users and provides everything needed to immediately begin using KNIME as well as extend KNIME with extension packages developed by others.

Windows

KNIME Analytics Platform for Windows (installer) *The installer adds an icon to the desktop and suggests suitable memory settings*	**Download**	(548 MB)
KNIME Analytics Platform for Windows (self-extracting archive) *The self-extracting archive only creates a folder holding the KNIME installation*	**Download**	(553 MB)
KNIME Analytics Platform for Windows (zip archive)	**Download**	(677 MB)

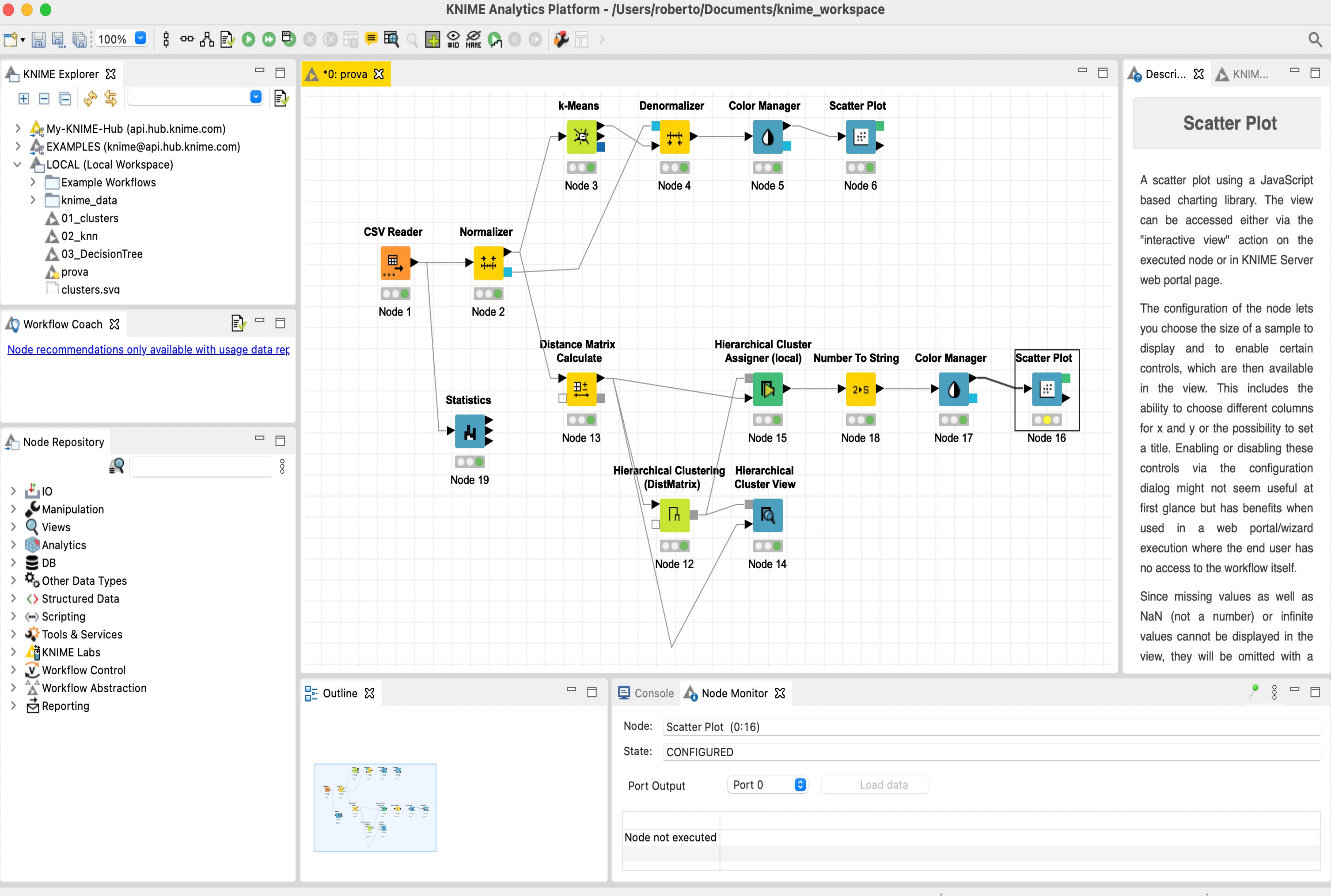
Linux

KNIME Analytics Platform for Linux	**Download**	(712 MB)

Mac

KNIME Analytics Platform for macOS (10.13 and above)	**Download**	(556 MB)

Find out what's new in the latest KNIME 4.4 release here.



Scatter Plot

A scatter plot using a JavaScript based charting library. The view can be accessed either via the "interactive view" action on the executed node or in KNIME Server web portal page.

The configuration of the node lets you choose the size of a sample to display and to enable certain controls, which are then available in the view. This includes the ability to choose different columns for x and y or the possibility to set a title. Enabling or disabling these controls via the configuration dialog might not seem useful at first glance but has benefits when used in a web portal/wizard execution where the end user has no access to the workflow itself.

Since missing values as well as NaN (not a number) or infinite values cannot be displayed in the view, they will be omitted with a

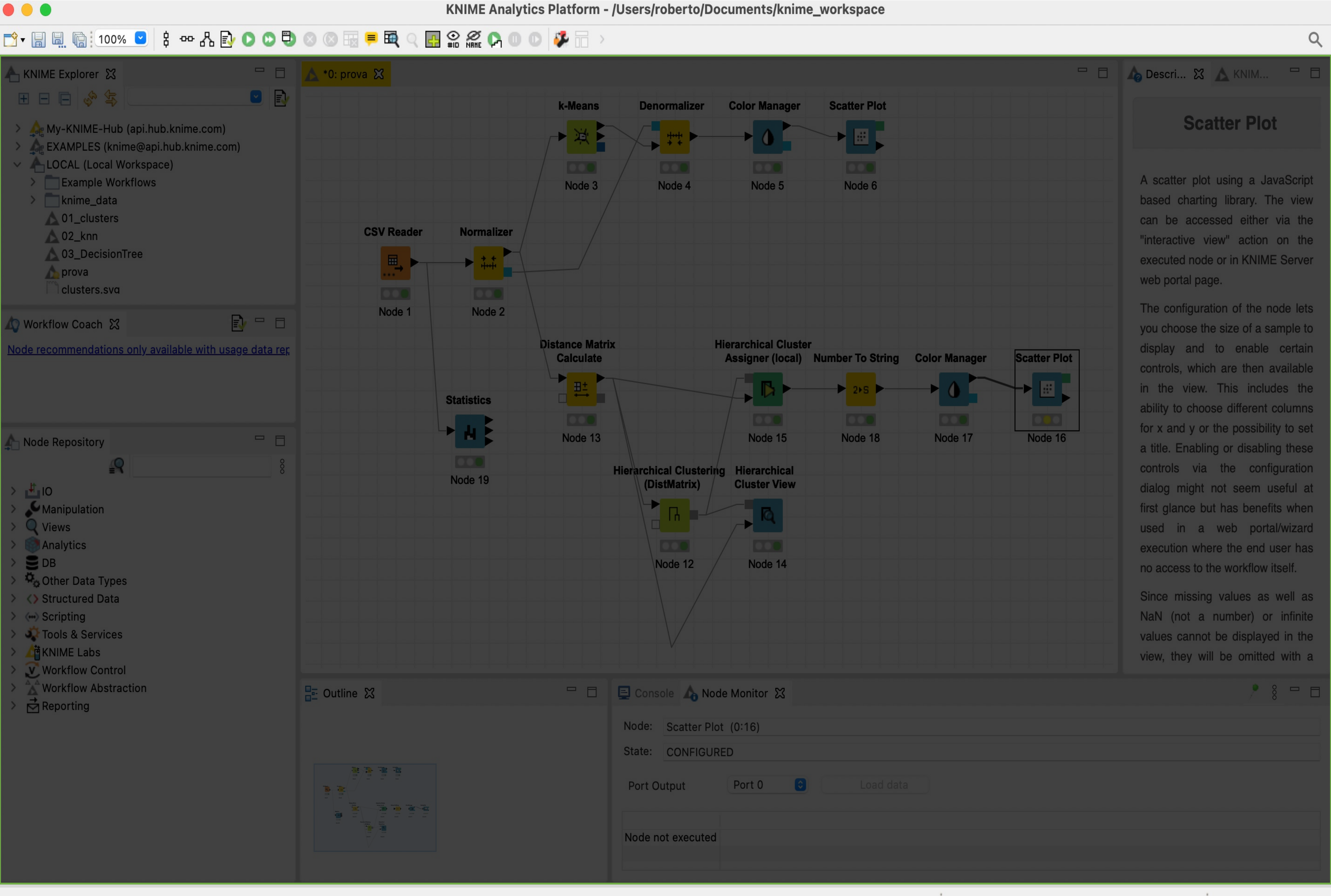
Node: Scatter Plot (0:16)

State: CONFIGURED

Port Output: Port 0

Node not executed

Barra dei comandi, bottoni di esecuzione e layout



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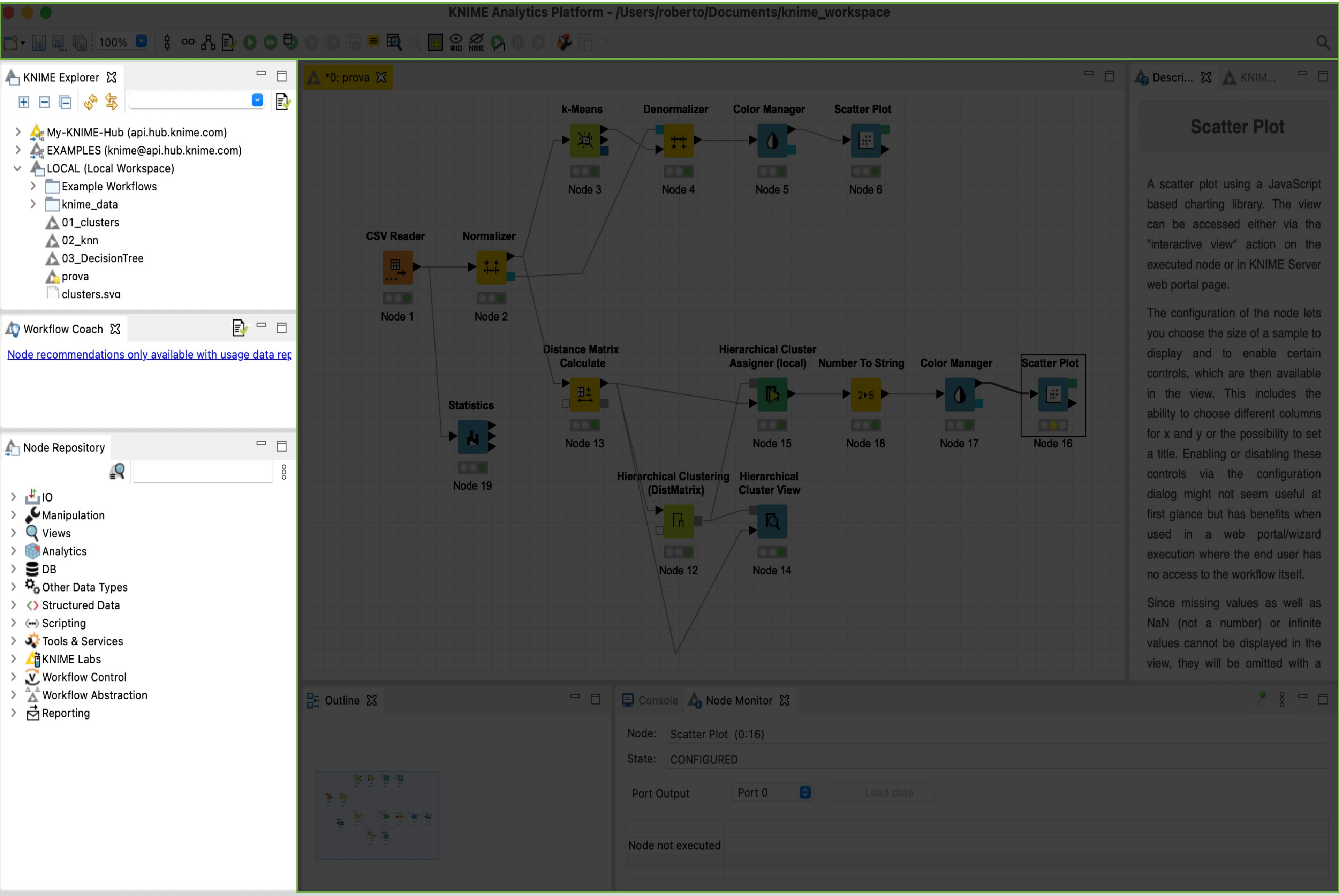
Node: Scatter Plot (0:16)

State: CONFIGURED

Node not executed

Barra laterale del workspace e selezione dei nodi



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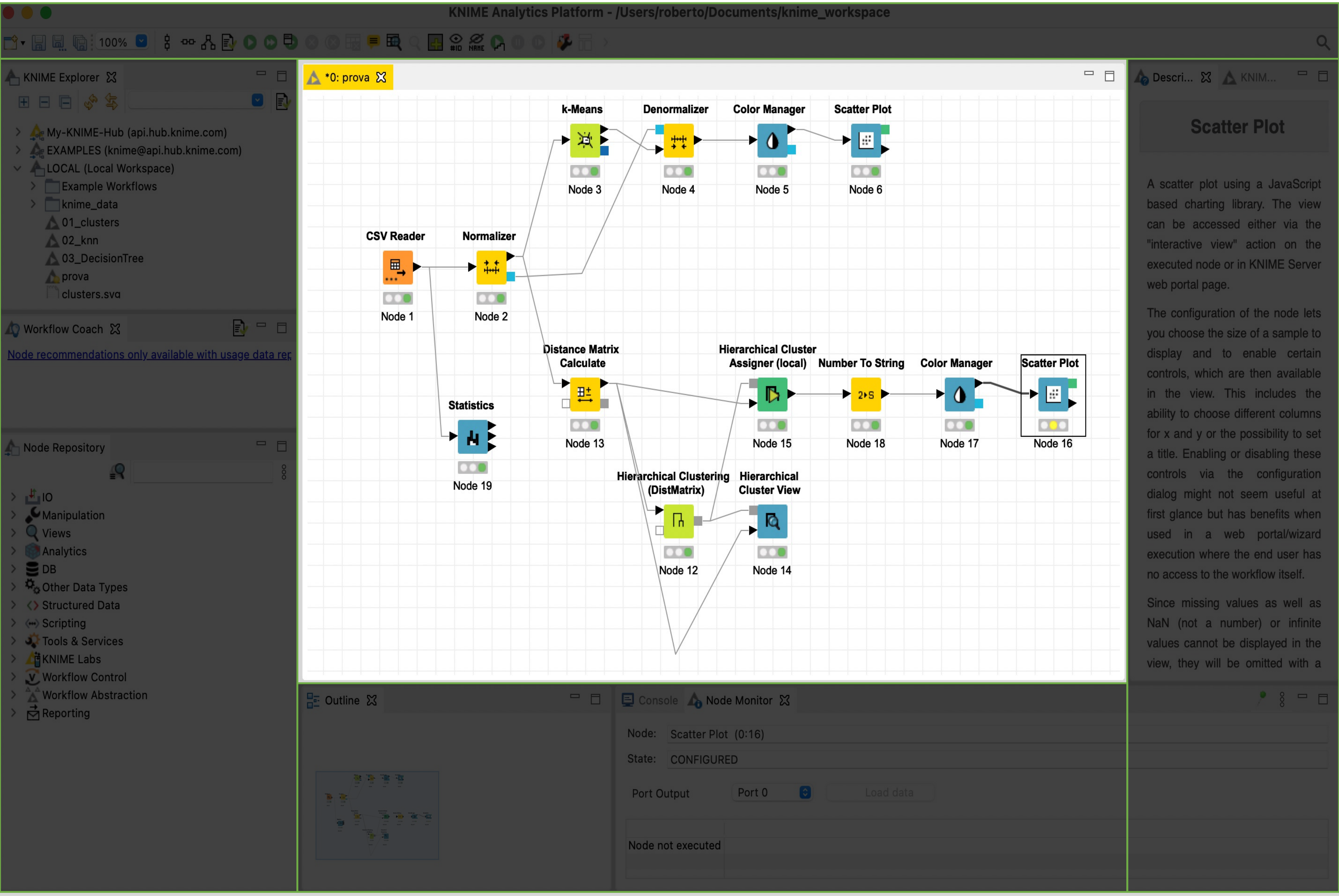
Node: Scatter Plot (0:16)

State: CONFIGURED

Port Output Port 0 Load data

Node not executed

Workspace principale



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Node: Scatter Plot (0:16)

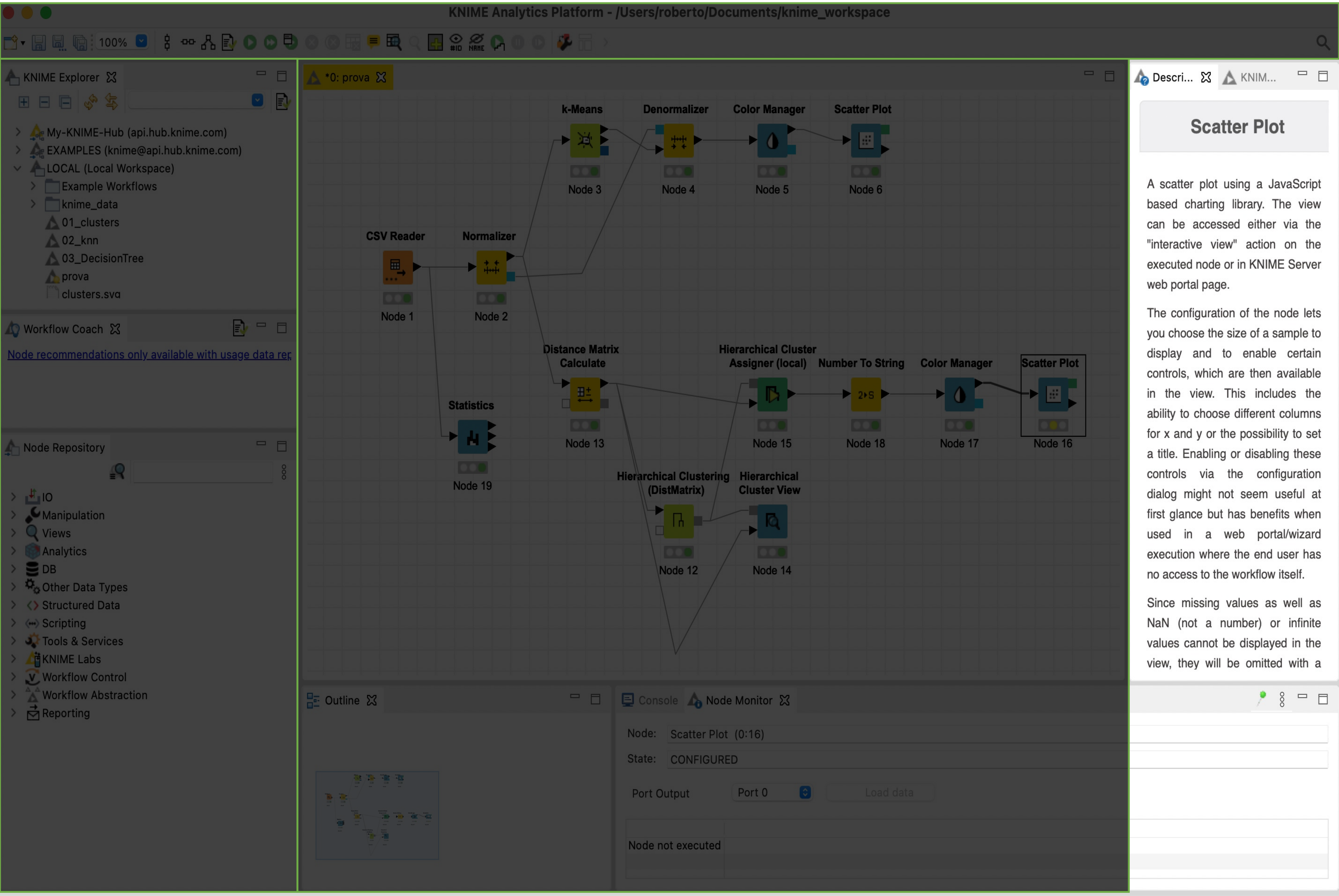
State: CONFIGURED

Port Output: Port 0

Load data

Node not executed

Descrizione dei nodi e del workspace



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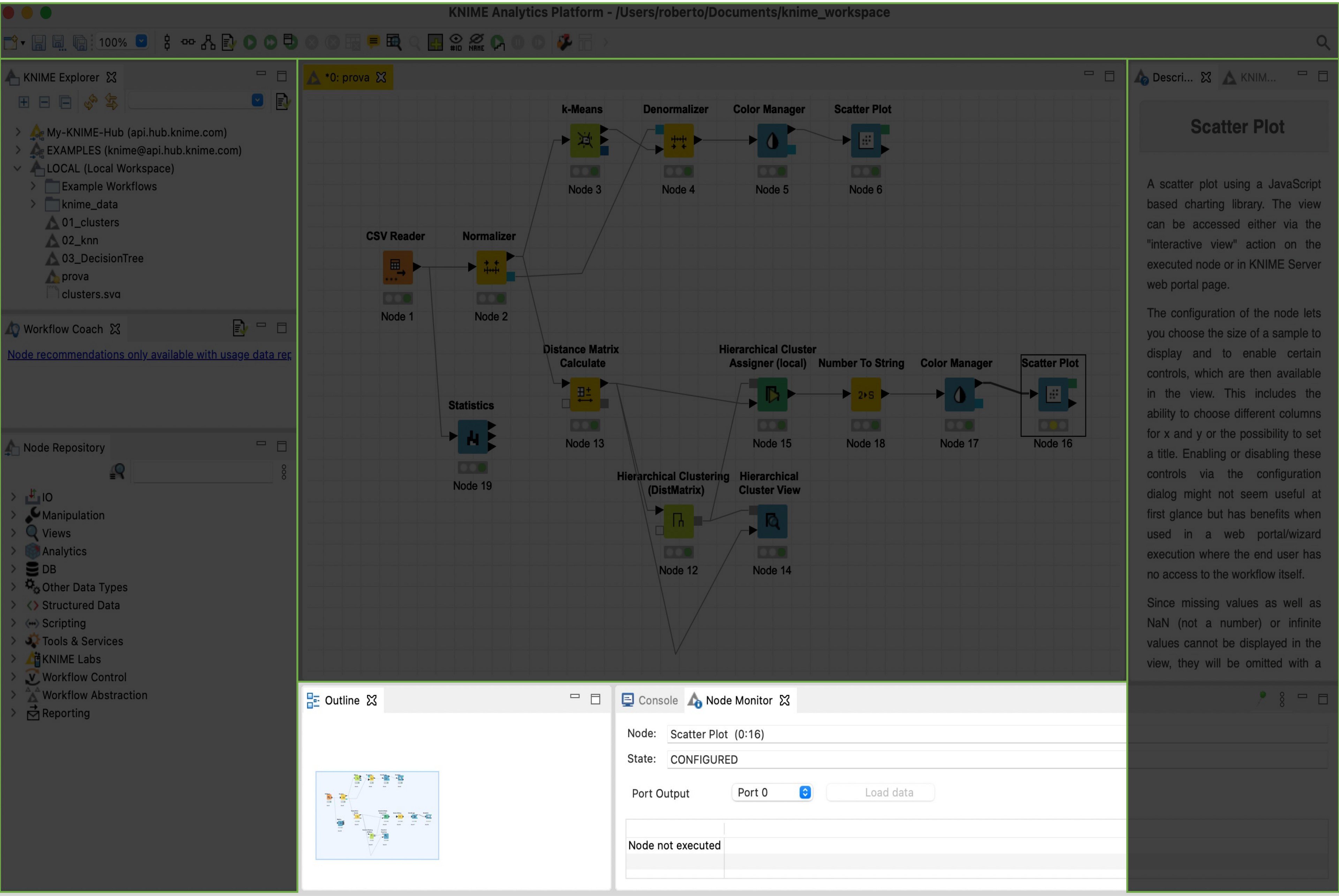
Node: Scatter Plot (0:16)

State: CONFIGURED

Port Output: Port 0

Node not executed

Outline e console



KNIME Analytics Platform - /Users/roberto/Documents/knime_workspace

Node: Scatter Plot (0:16)

State: CONFIGURED

Port Output: Port 0

Node not executed

Scatter Plot

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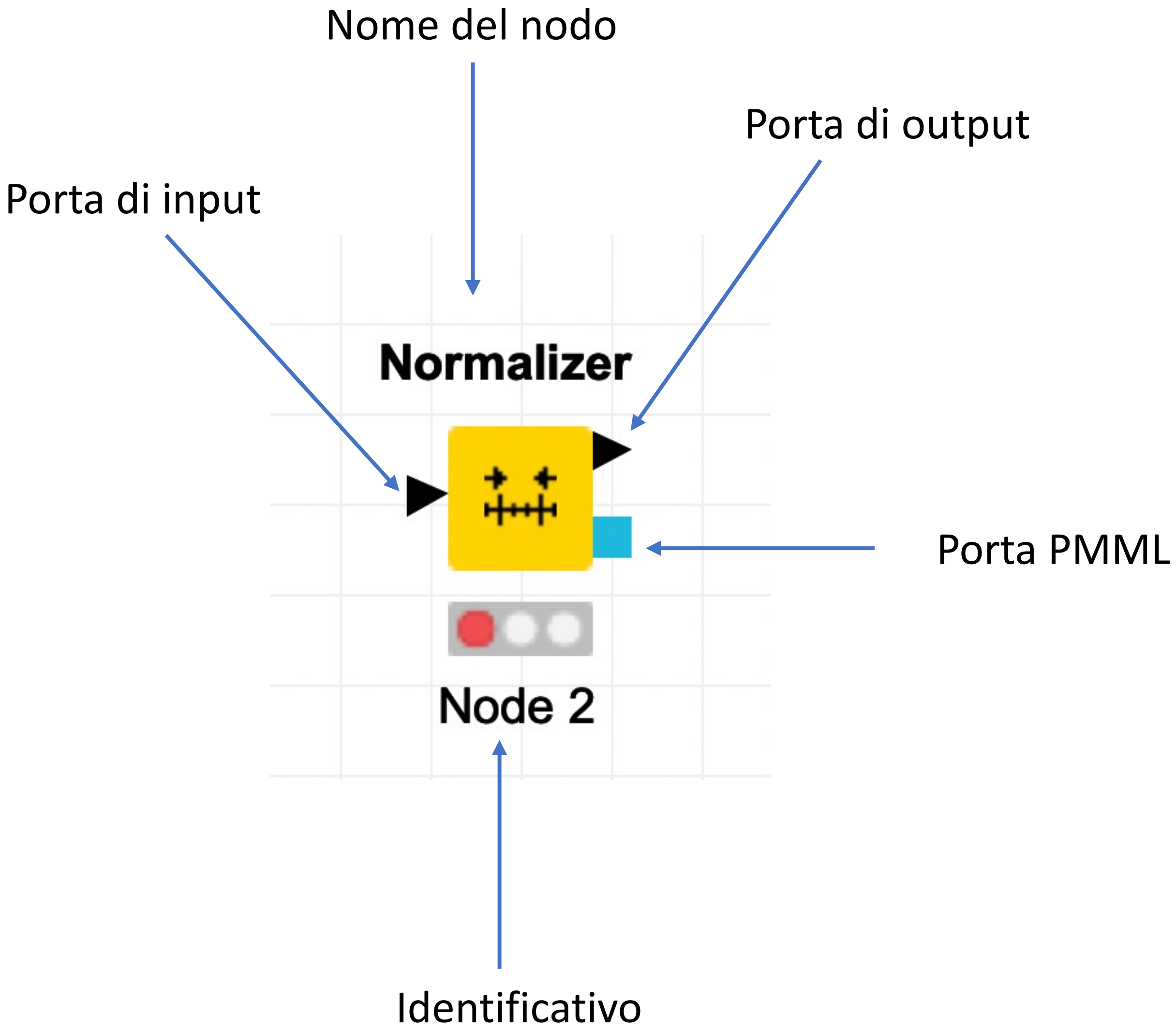
Struttura di un nodo



Nome del nodo

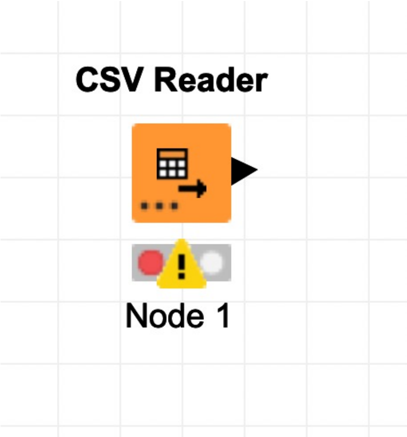
Porta di output

Porta di input

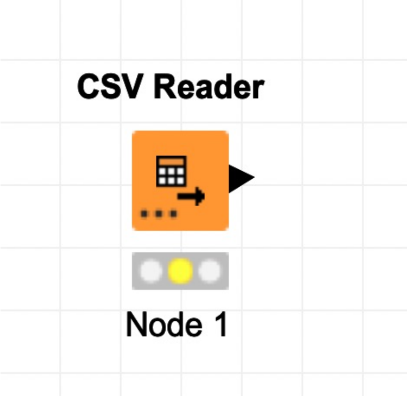
Porta PMML

Identificativo

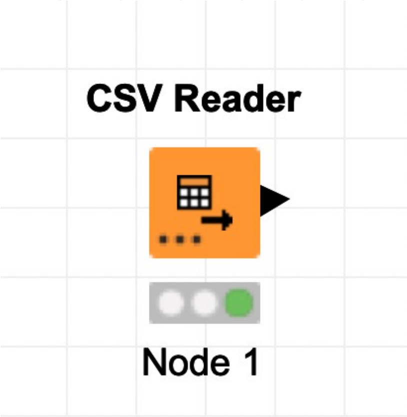
Stato del nodo



Da configurare

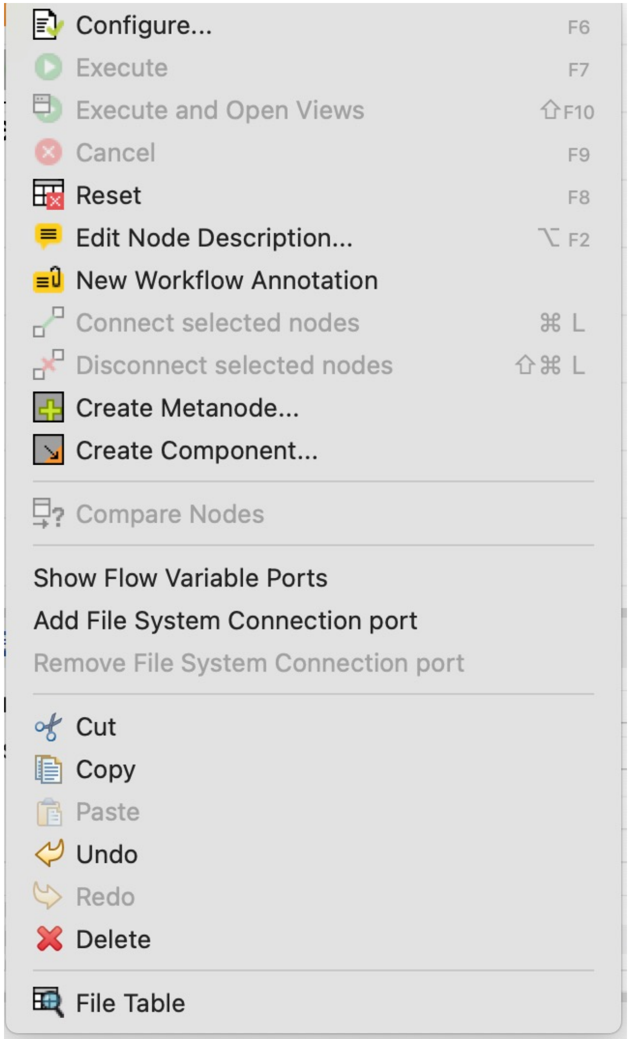


Pronto all’esecuzione

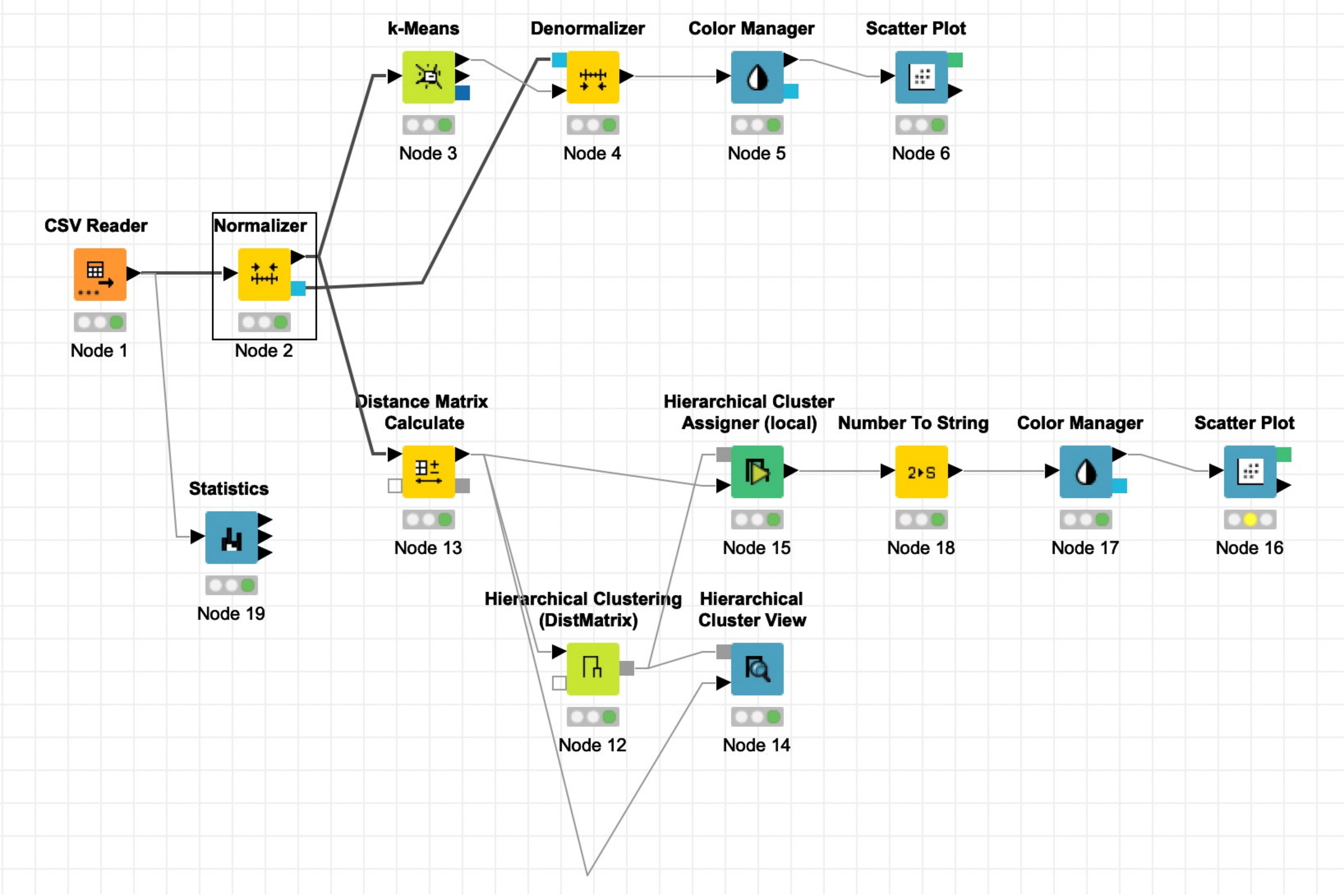


Eseguito

Menù contestuale:
tasto destro del mouse


Configure... F6
Execute F7
Execute and Open Views ⇧F10
Cancel F9
Reset F8
Edit Node Description... ⌥ F2
New Workflow Annotation
Connect selected nodes ⌘ L
Disconnect selected nodes ⇧⌘ L
Create Metanode...
Create Component...
Compare Nodes
Show Flow Variable Ports
Add File System Connection port
Remove File System Connection port
Cut
Copy
Paste
Undo
Redo
Delete
File Table

Un workflow di esempio



Normalizer

$$z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$$

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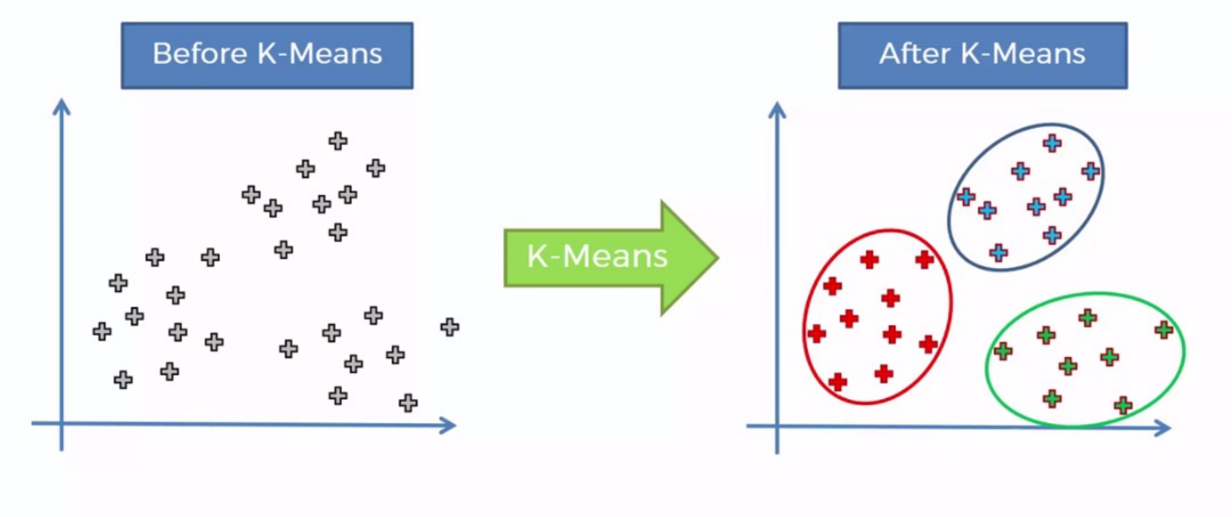
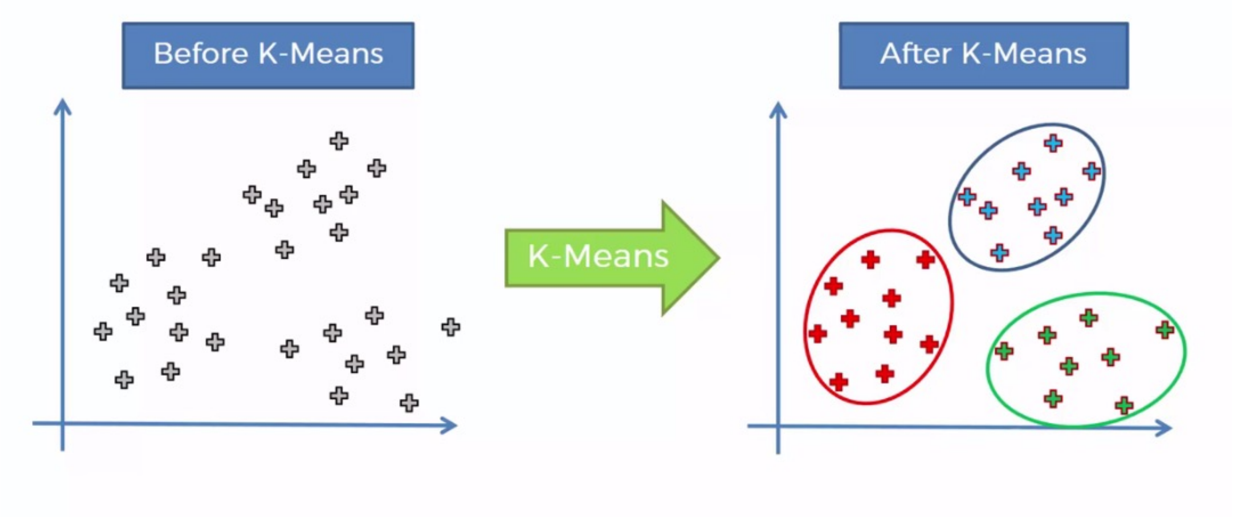
K-means



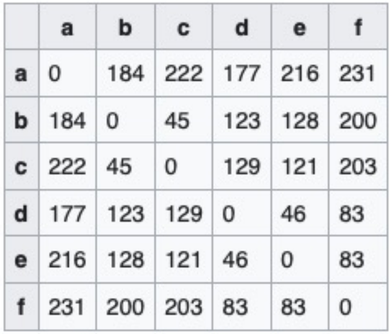
Normalizer

$$z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$$

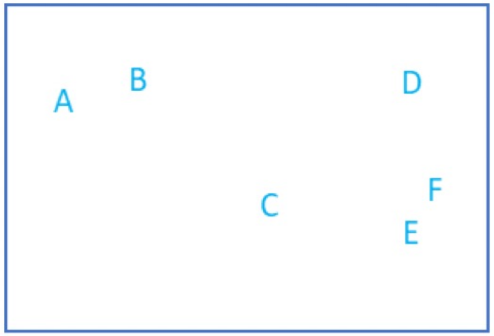
K-means

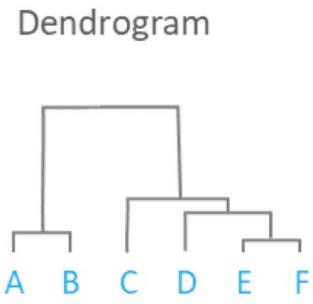


Cluster Gerarchico

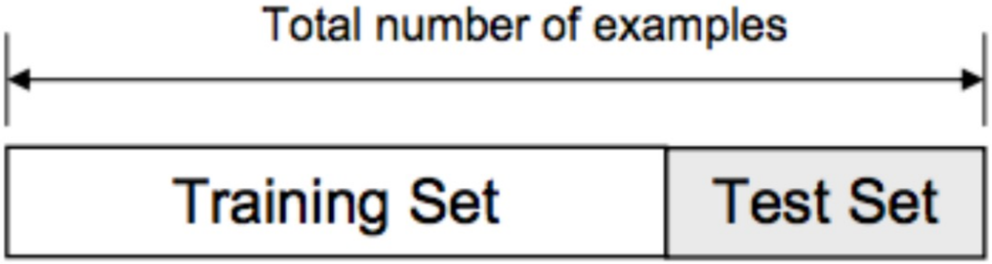


	a	b	c	d	e	f
a	0	184	222	177	216	231
b	184	0	45	123	128	200
c	222	45	0	129	121	203
d	177	123	129	0	46	83
e	216	128	121	46	0	83
f	231	200	203	83	83	0

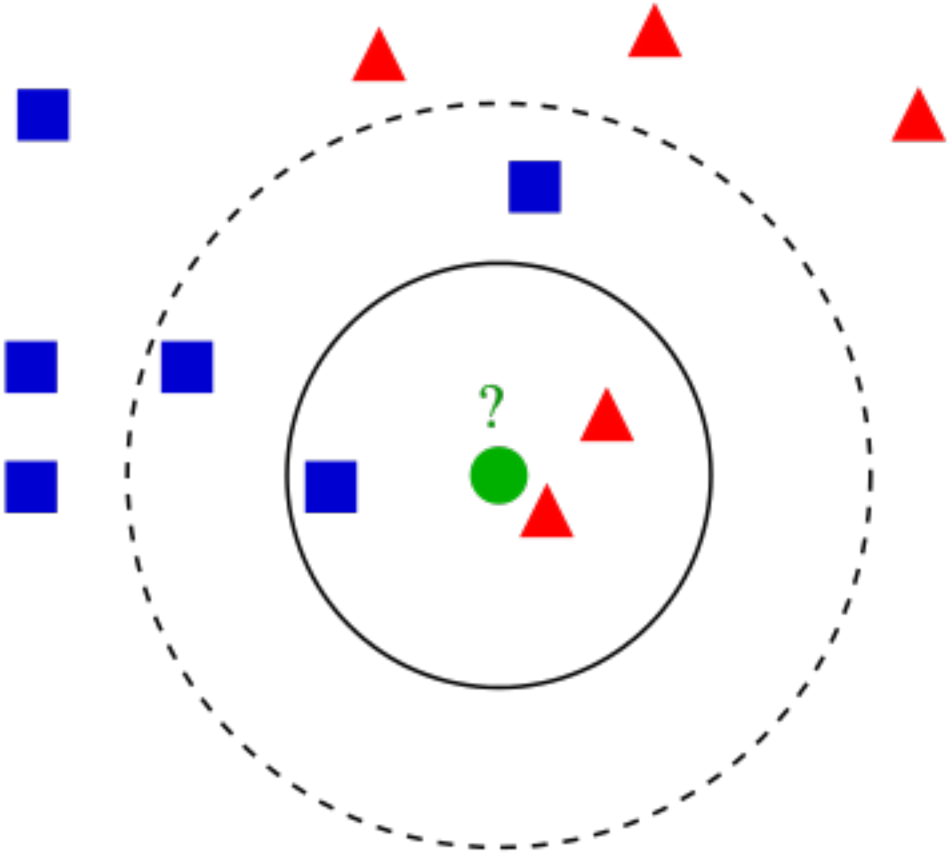




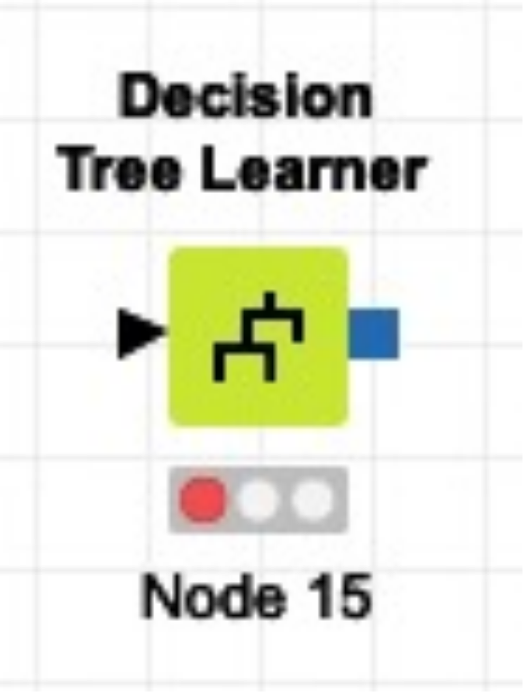
Train e test

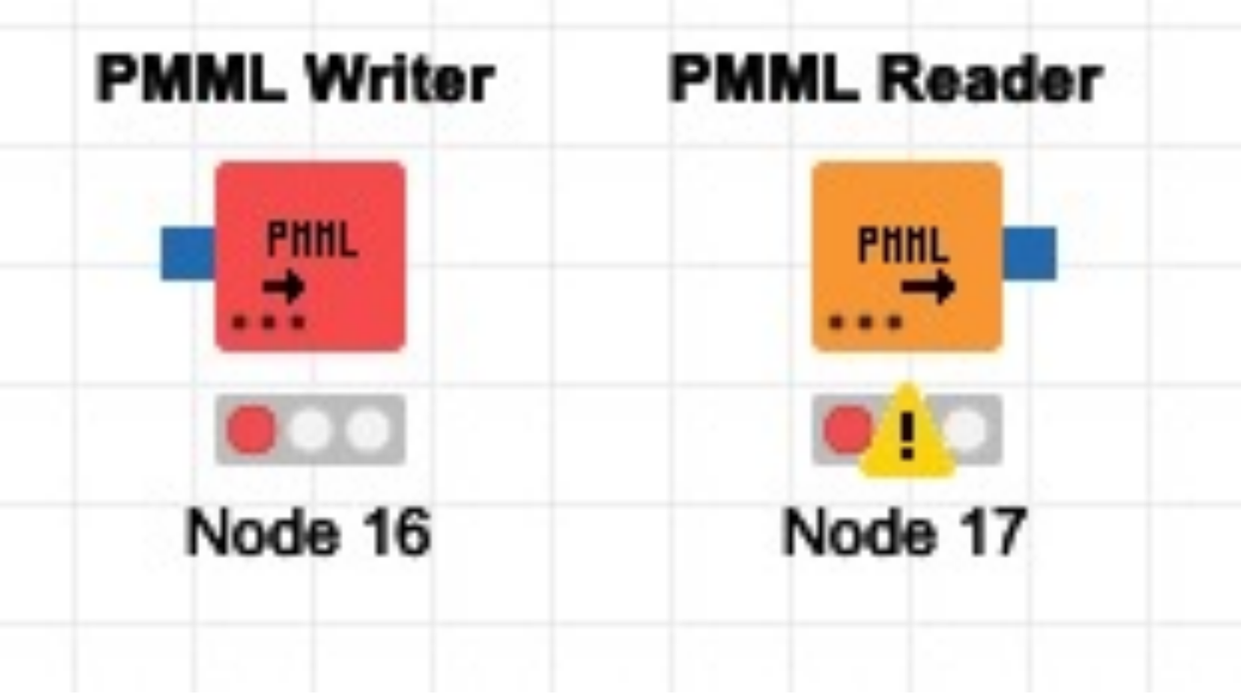


Knn



Alcuni classificatori ci restituiscono il modello allenato come un dato PMML (notare la porta in output) Possiamo poi salvarlo per riutilizzarlo più avanti.


Decision Tree Learner
Node 15


PMML Writer
PMML
Node 16
PMML Reader
PMML
Node 17