



Developing apps for
Cytoscape

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Apps/plugins

Cytoscape App Store

Submit an App

All Apps

Categories

- collections
- data visualization
- network generation
- graph analysis
- network analysis
- online data import
- integrated analysis
- clustering
- systems biology
- utility
- enrichment analysis
- data integration
- visualization
- automation
- layout
- core app
- pathway database

Newest Releases



Omnipath

Omnipath: literature curated human signaling pathways

3.0+



WikiPathways

WikiPathways web service client and GPML file format importer

3.0+



ModuLand 2.0

Modularization method family offering modular hierarchies and

3.0+

Top Downloaded Apps

Agilent Literature Search 3.1.1 (LitSearch version 2.69)

File View Help

Terms

P53
BCLX
SRC

Context

Search Controls

Max Engine Matches: 10 Use Aliases: ☒ Use Context: ☒ Concept Lexicon Restricts Search: ☒

Extraction Controls

Concept Lexicon: Homo sapiens Interaction Lexicon: limited

Query Editor

(trp53 OR tjj92943 OR p53 OR tp53 OR lfs1)
(bcl-xl/s OR bclx OR dkfzp781p2092 OR bcl2l1 OR bcl-xs OR bcl-xl OR bcl2l OR bcl-x)
(c-src OR asv OR src OR src1 OR p60-src)

Refresh Query Matches Reanalyze

Completed:

- [Insights into cellular metabolic pathways of the combined toxicity responses of Caco-2 cells exposed to deoxynivalenol, zearalenone and Aflatoxin B \(by Ji J. Wang Q. Wu H. Xia S. Guo H. Blazenovic I. Zhang Y. Sun X.\) \[Food Chem Toxicol, Jan, 2019\] \[Journal Article\]](#)
Metabolic profiling in Caco-2 cells was studied for the combined toxic effects of deoxynivalenol (DO...
Source: [PubMed] https://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=30668976
- [Tyrosine kinase c-Abl couples RNA polymerase II transcription to DNA double-strand breaks \(by Burger K. Schlackow M. Gullerova M.\) \[Nucleic Acids Res, Jan, 2019\] \[Journal Article\]](#)
DNA is constantly exposed to endogenous and exogenous damage. Various types of DNA repair counteract...
Source: [PubMed] https://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=30668775

Page: 1 of 2

Completed
Unanalyzed
Unread



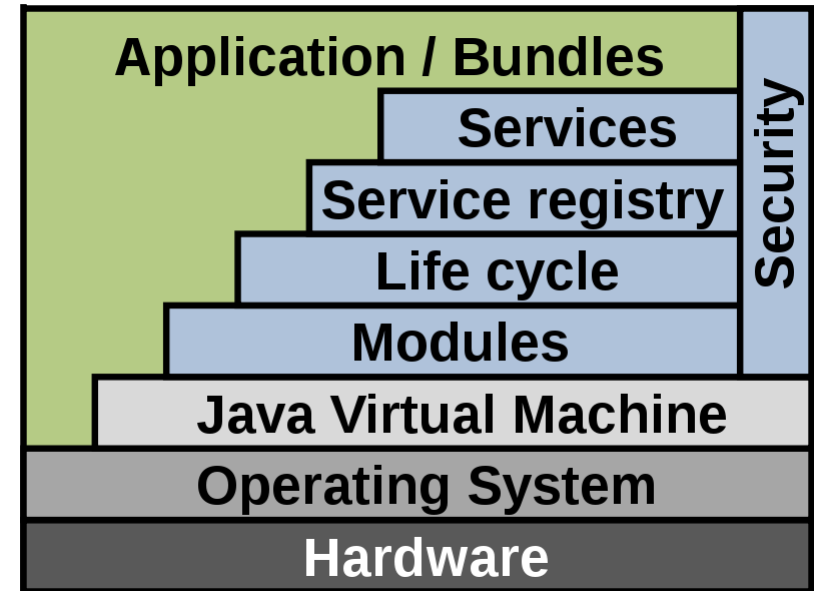
OSGi



Open Services Gateway initiative.

Dynamic module system / service platform for Java applications. Bundles can be deployed, installed, started, stopped, modified, removed all without needing to restart.

OSGi “bundles” are normal JAR files with extra manifest headers.



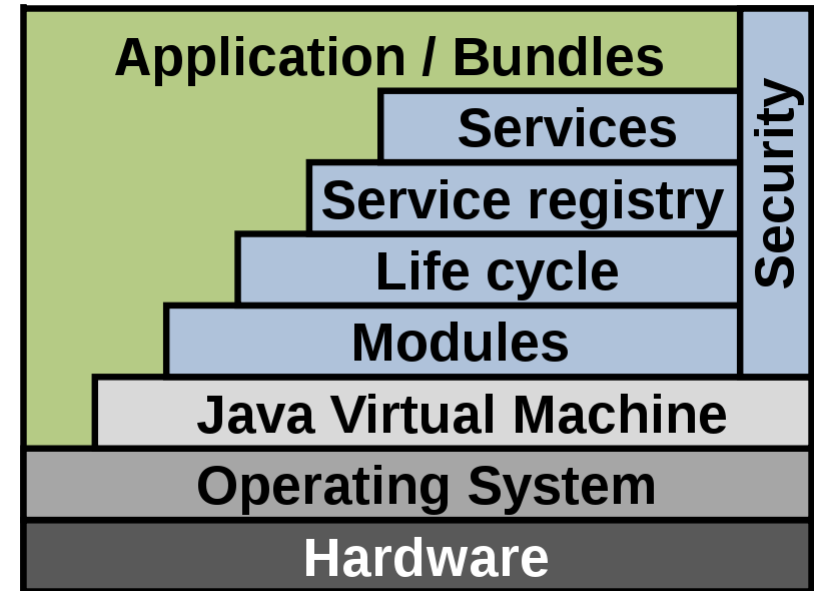


Activator



Instead of a "main class", the entry point for an OSGi bundle is an "Activator class", which implements BundleActivator:

```
public class Activator implements BundleActivator {  
    public void start(BundleContext context) { ... }  
    public void stop(BundleContext context) {... }  
}
```





CyActivator



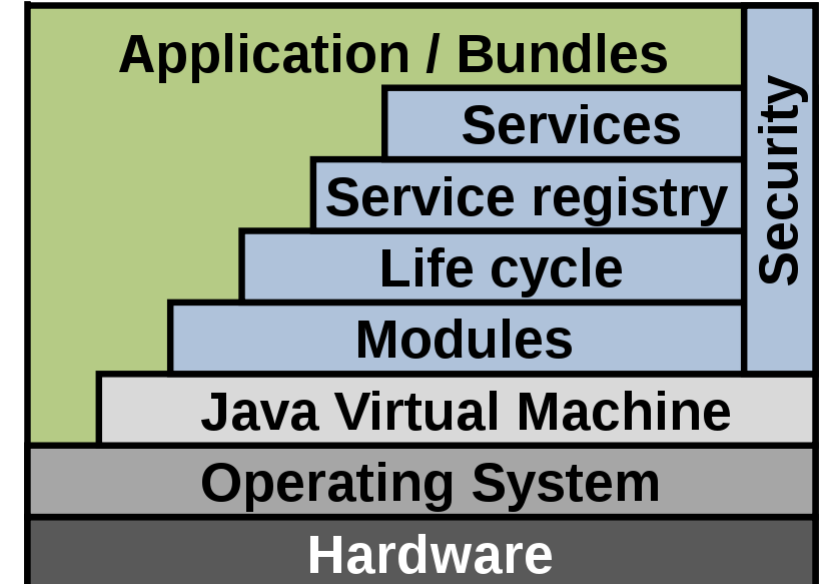
Cytoscape



OSGi™

For Cytoscape Apps, the entry point is a CyActivator:

```
public class CyActivator extends AbstractCyActivator {  
    public CyActivator() {  
        super();  
    }  
    @Override  
    public void start(BundleContext bc) {  
        // TODO  
    }  
}
```





Services and Actions

```
public class CyActivator extends AbstractCyActivator {  
    public void start(BundleContext context) {  
        Service s = getService(context, Service.class);  
        Action someAction = new Action(s);  
        registerService(context, someAction, . . .);  
    }  
}
```



```
public class Action extends AbstractCyAction {  
    Action(Service s) {  
        // store Service S  
    }  
    public void actionPerformed(ActionEvent e) {  
        // Do something with Service s  
    }  
}
```



CyNetworkView, CyNetwork

Our two most important classes.

- `CyNetwork` contains all the information on the loaded Cytoscape network;
- `CyNetworkView` contains all the graphical information on the network.

```
CyApplicationManager cyAppManager = getService(bc,  
CyApplicationManager.class);
```

```
CyNetworkView netView = cyAppManager.getCurrentNetworkView();  
CyNetwork net = netView.getModel();
```



Important classes

CyNetwork

e.g. `CyNetwork.getNodeList()`
`CyNetwork.getRow(someNode)`
`CyNetwork.getNeighborList(someNode, CyEdge.Type.ANY)`

CyNode



CyEdge

e.g. `CyEdge.getSource()`
`CyEdge.getTarget()`

CyRow, CyTable

e.g. `CyRow.set("selected", true)`

CyTableUtil

e.g. `CyTableUtil.getNodesInState(net, "selected", true)`

CyNetworkView

e.g. `CyNetworkView.updateView()`



Cytoscape API

<http://chianti.ucsd.edu/cytoscape-3.6.0/API/>
https://cytoscape.org/javadoc/current_release/

Cytoscape 3.6.0 API

All Classes

Packages

org.cytoscape.app
org.cytoscape.app.event
org.cytoscape.app.swing
org.cytoscape.application
org.cytoscape.application.events

All Classes

AboutToRemoveEdgesEvent
AboutToRemoveEdgesListener
AboutToRemoveEdgeViewsEvent
AboutToRemoveEdgeViewsListener
AboutToRemoveNodesEvent
AboutToRemoveNodesListener
AboutToRemoveNodeViewsEvent
AboutToRemoveNodeViewsListener
AbstractBounded
AbstractCellEditor
AbstractConfigDirPropsReader
AbstractCyAction
AbstractCyActivator
AbstractCyApp
AbstractCyEdit
AbstractCyEvent
AbstractCyJob
AbstractCyNetworkReader
AbstractCyPayloadEvent
AbstractCySwingApp
AbstractEdgeViewTask
AbstractEdgeViewTaskFactory
AbstractFunction

OVERVIEW PACKAGE CLASS USE TREE DEPRECATED INDEX HELP

PREV NEXT FRAMES NO FRAMES

Cytoscape Swing App API (swing-app-api) 3.6.0 API

This document represents the API specification for Cytoscape 3.0 using a Java Swing front-end.

See: Description

Packages

| Package | Description |
|--|--|
| org.cytoscape.app | This is the Cytoscape App API, which supports development of Cytoscape 3.X apps in a manner similar to apps developed in Cytoscape 2.X. |
| org.cytoscape.app.event | |
| org.cytoscape.app.swing | This is the Cytoscape Swing App API, which supports development of Cytoscape 3.X apps in a manner similar to apps developed in Cytoscape 2.X and provides full access to the Swing specific services of the Cytoscape API in addition to all other services provided in Cytoscape App API. |
| org.cytoscape.application | This package provides Cytoscape version number, application-wide setting, basic access to current network, selected networks, views and rendering engines. |
| org.cytoscape.application.events | This package provides application events/listeners, including Cytoscape startup/shutdown, setCurrentNetwork/setCurrentNetworkView/ setSelectedNetwork. |
| org.cytoscape.application.swing | This package defines the various interfaces, abstract classes, and enums that represent the Cytoscape Swing Application API. |
| org.cytoscape.application.swing.events | This package defines the various events fired by the Cytoscape Swing Application API. |
| org.cytoscape.application.swing.search | |

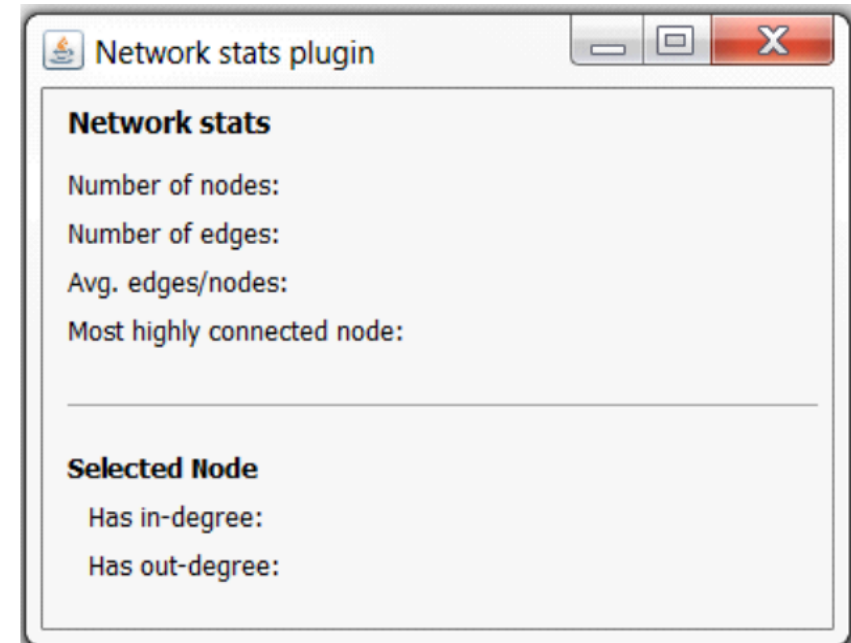


Our application

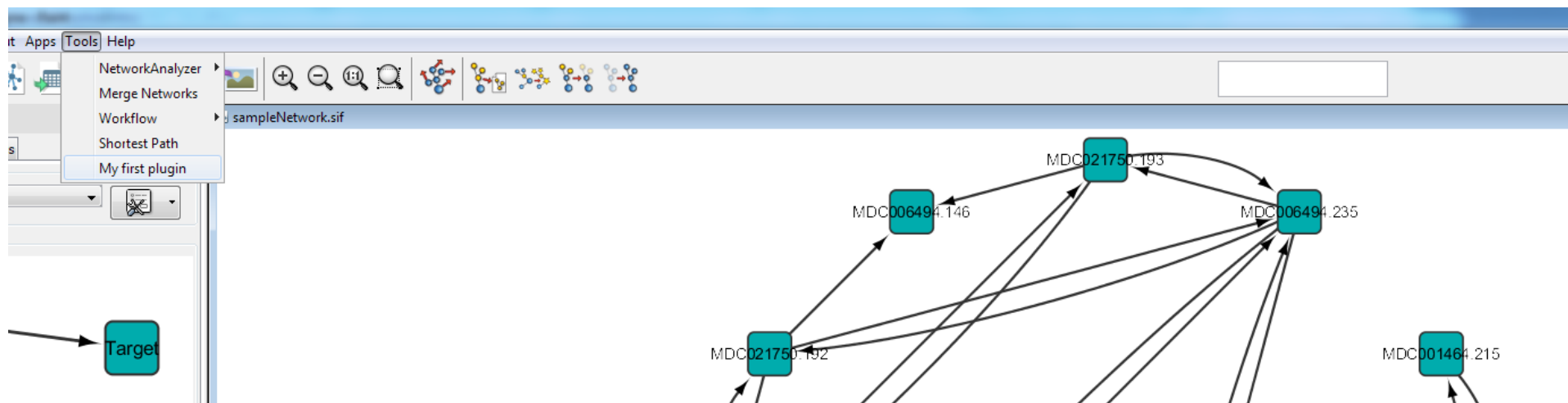
Our plugin will compute and display some simple statistics for the displayed graph and for a selected node.

What kind of stats?

- Number of nodes
- Number of edges
- Average edges/node
- Most highly connected node
- In-degree of a selected node
- Out-degree of a selected node



We can use sampleNetwork.sif from Canvas for testing.



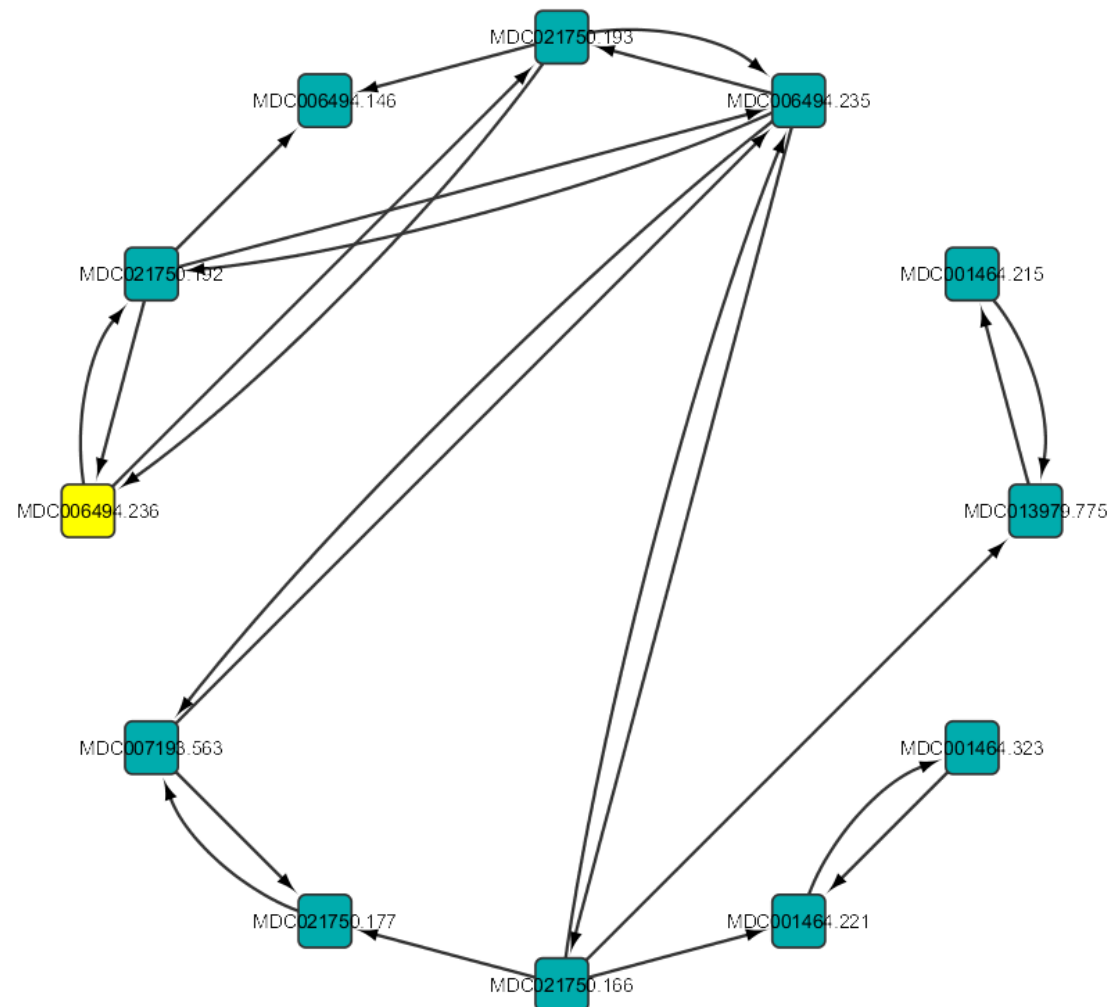
Network stats plugin

Network stats

- Number of nodes: 12
- Number of edges: 23
- Avg. edges/nodes: 1.9166666
- Most highly connected node: MDC006494.235

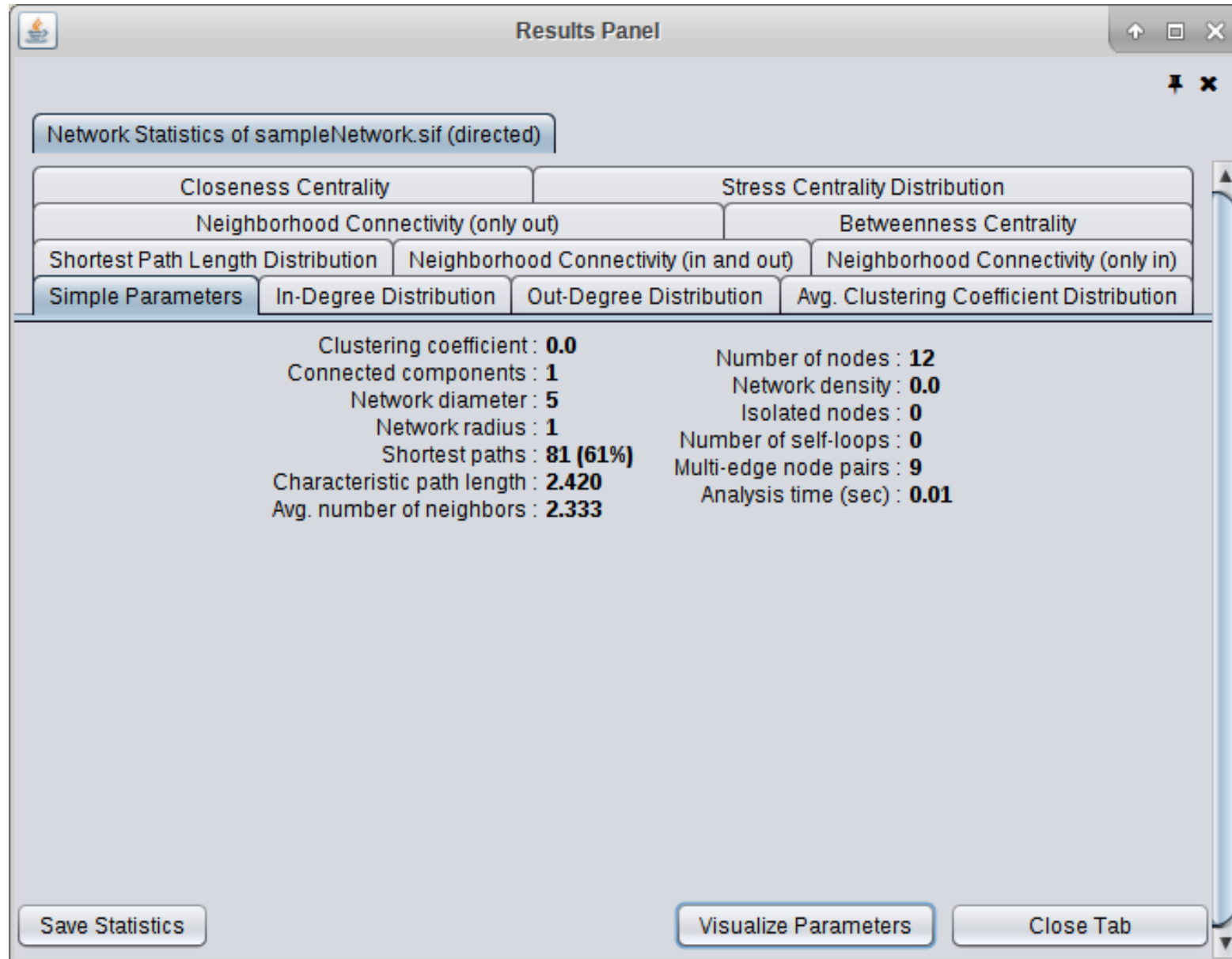
Selected Node MDC006494.236

- Has in-degree: 2
- Has out-degree: 2

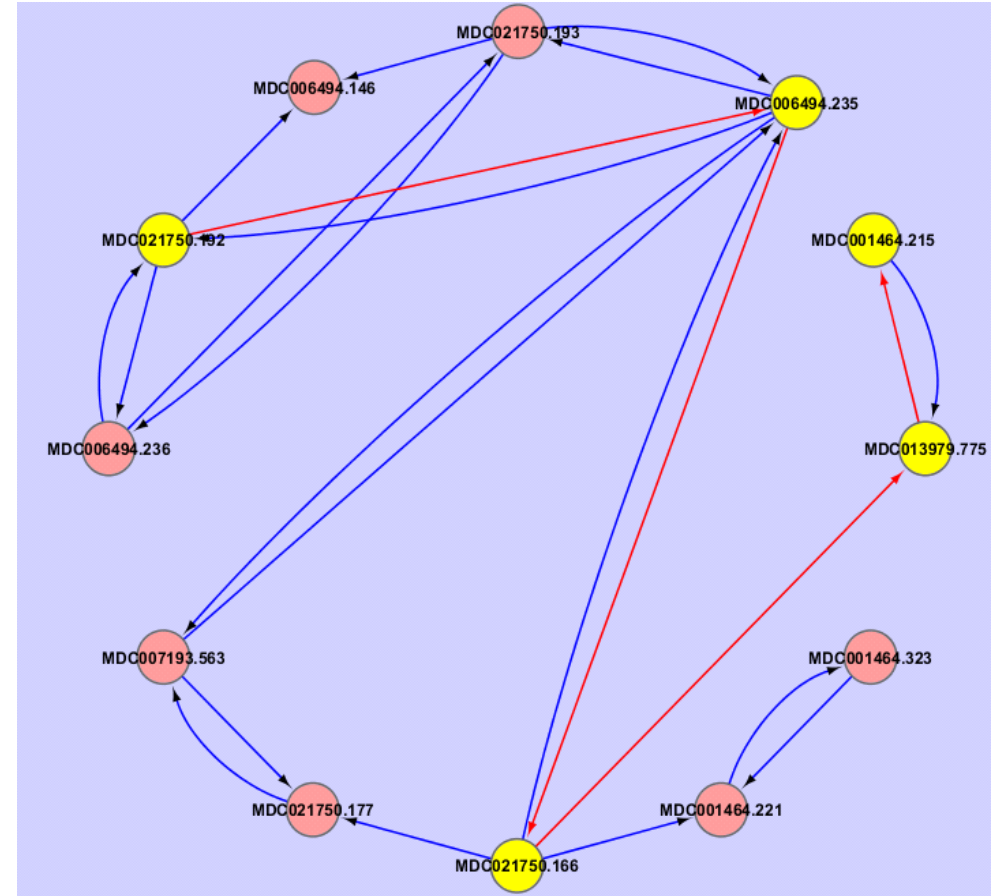
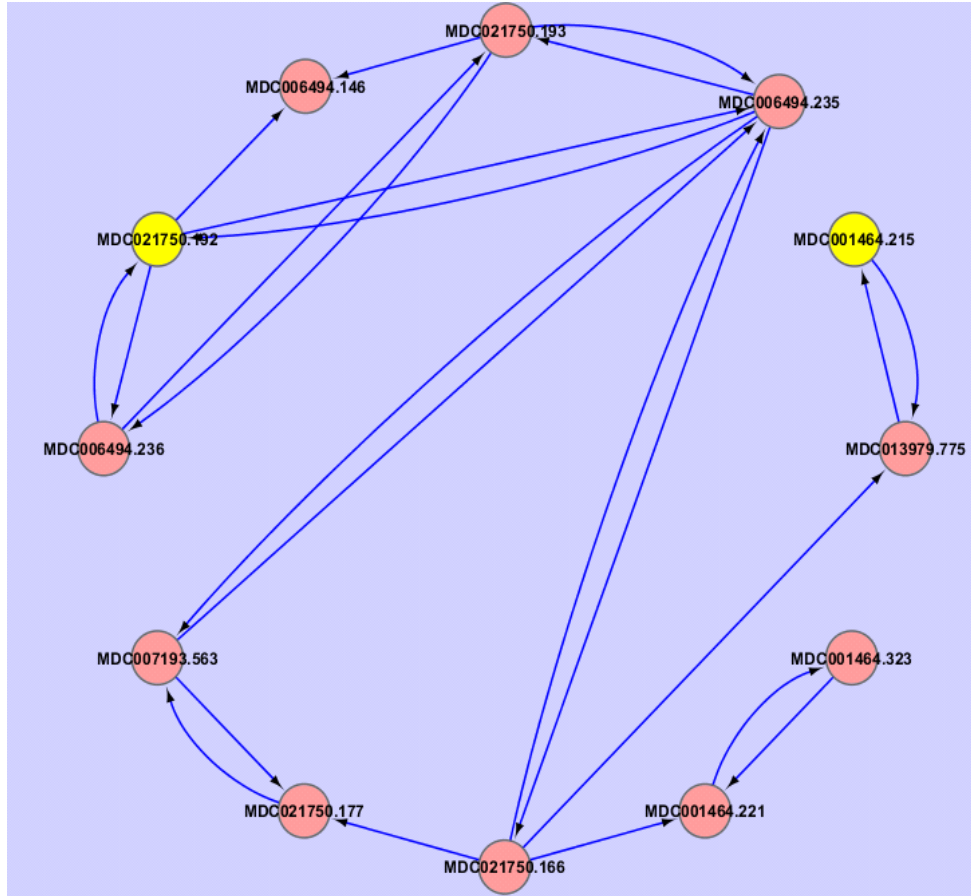




Network Analyzer



Extra task – shortest path between two nodes (BFS)



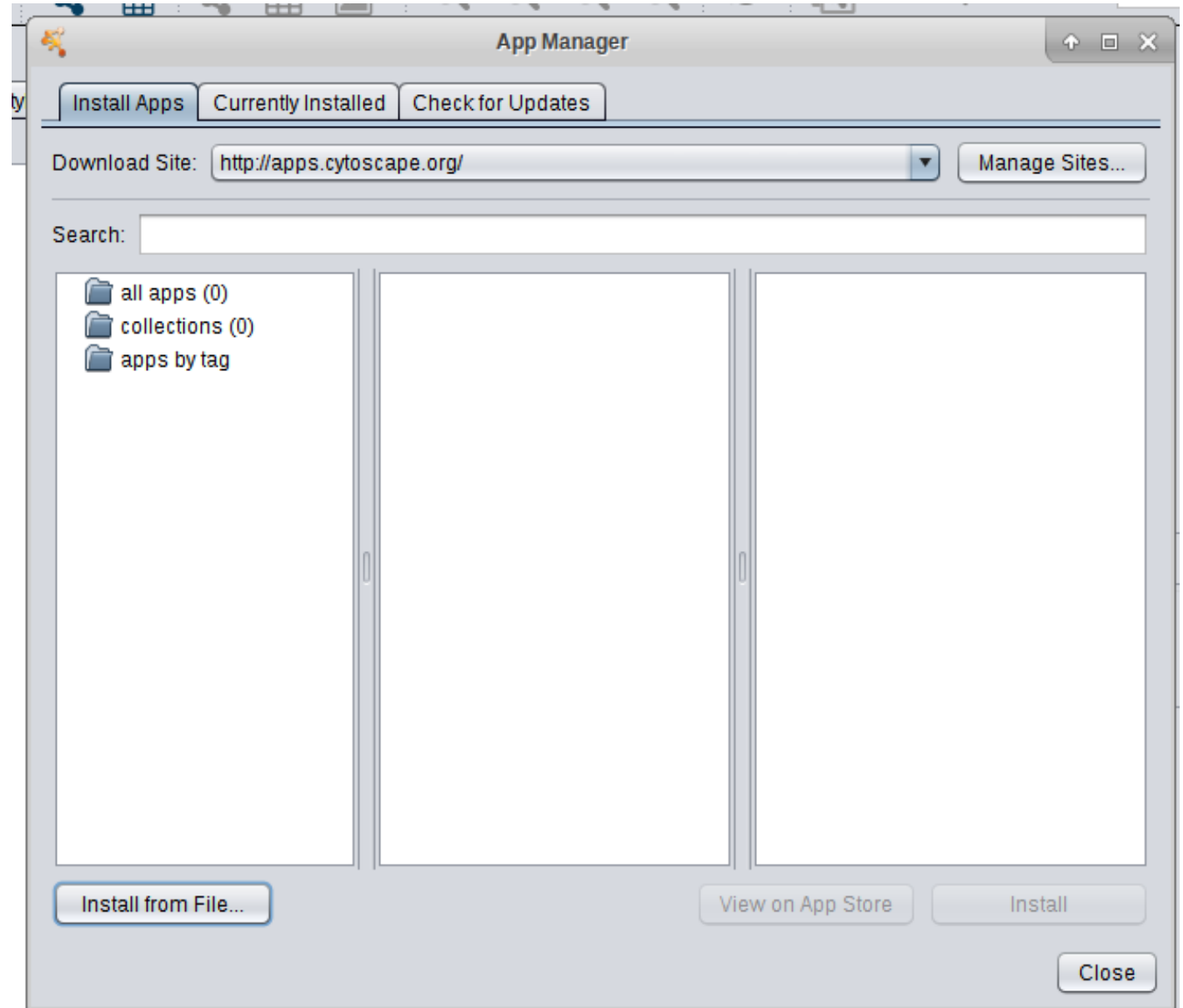


Installing an app

Once you compile our OSGi bundle (app), the JAR will be in the **target/** directory (NOT dist/).

You can install it in the Cytoscape App Manager by clicking the "Install from File..." button.

Make sure to start Cytoscape from the command line – any errors (and log messages) from your app will be printed there!





Maven

Maven™

- Build automation system.
- Will download your dependencies for you!
- Will *find* dependencies for you!
- Configuration in **pom.xml / build.xml / settings.xml**





Maven dependencies



Netbeans gives you the option to locate and add dependencies ("**Search Dependency at Maven Repositories**") when clicking the lightbulb next to your code, but you can also add them to **pom.xml** manually, which you may need to do for Cytoscape. First, you add the repository:

```
<repositories>
  <repository>
    <id>cytoscape_releases</id>
    <releases>
      <enabled>true</enabled>
    </releases>
    <name>Cytoscape Releases</name>
    <url>
http://code.cytoscape.org/nexus/content/repositories/releases/
    </url>
  </repository>
</repositories>
```





Maven dependencies

With the repository added (so that Maven can find dependencies), you can add the dependencies themselves:

```
<dependency>
  <groupId>org.cytoscape</groupId>
  <artifactId>swing-application-api</artifactId>
  <version>3.0.0</version>
</dependency>
<dependency>
  <groupId>org.cytoscape</groupId>
  <artifactId>work-api</artifactId>
  <version>3.0.0</version>
</dependency>
<dependency>
  <groupId>org.cytoscape</groupId>
  <artifactId>service-api</artifactId>
  <version>3.0.0</version>
</dependency>
```

