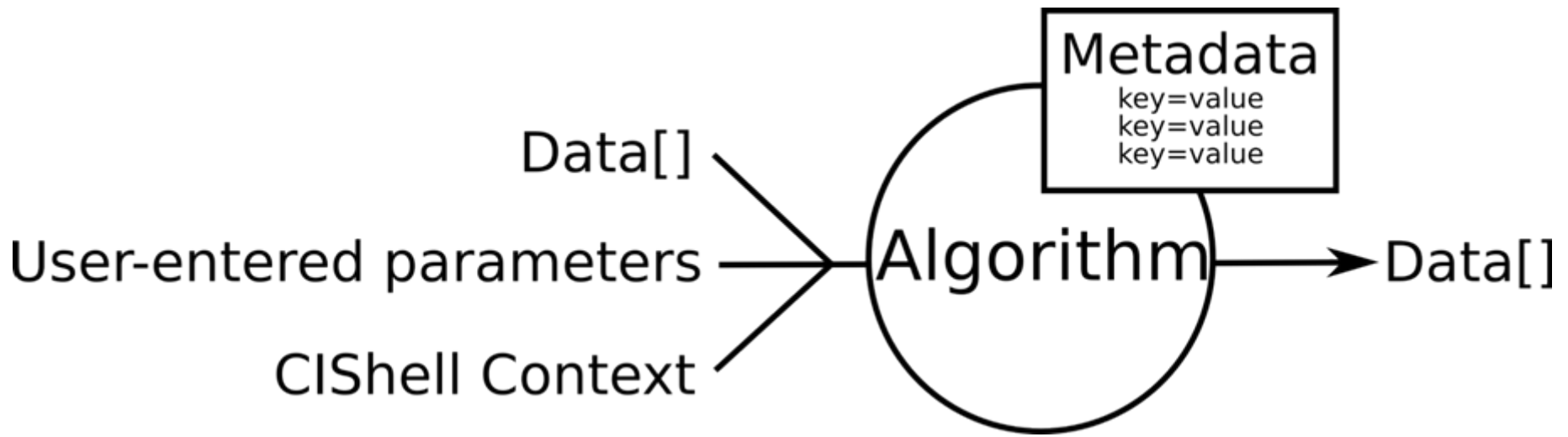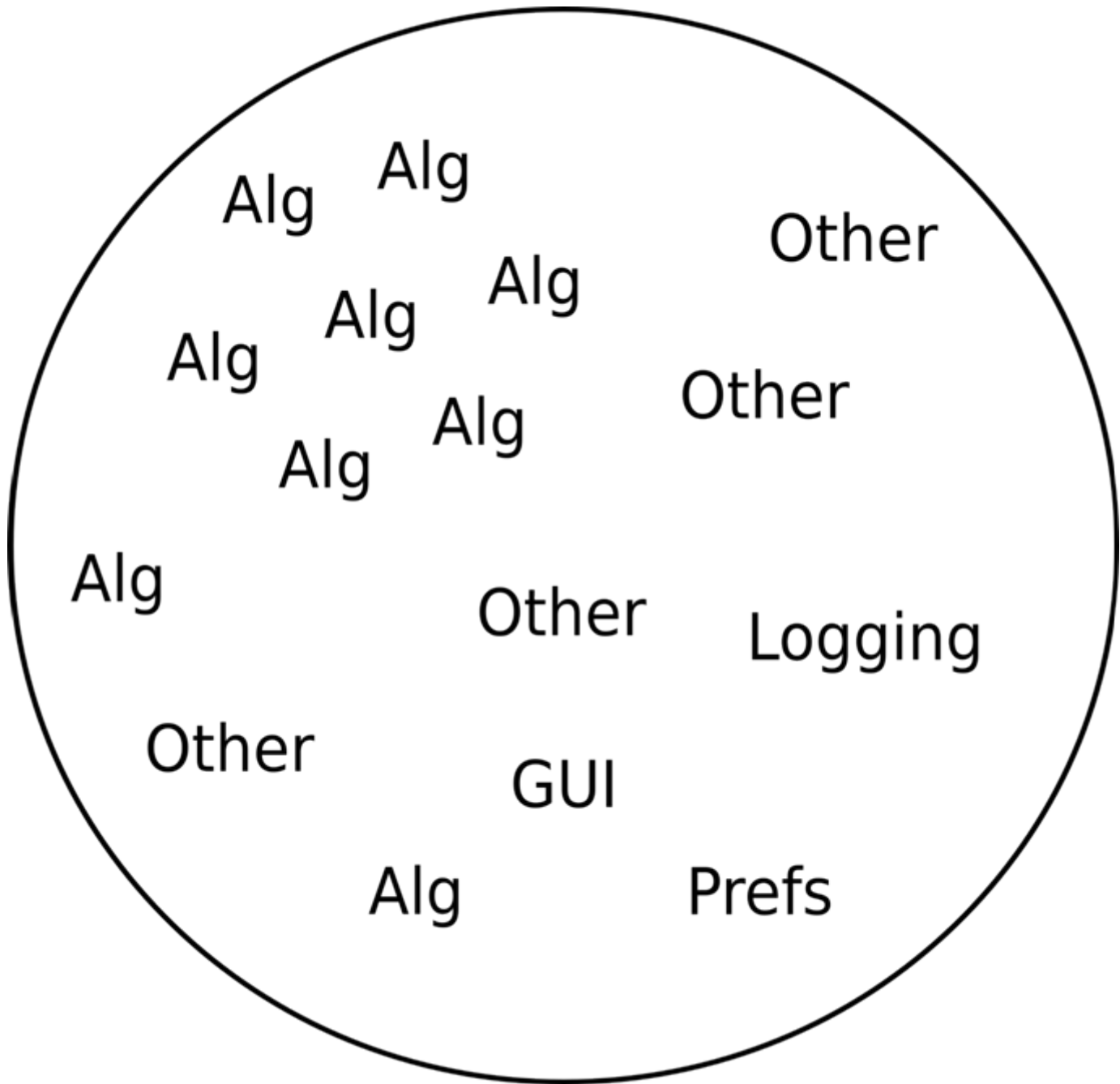# An Introduction to the Network Workbench and Cyberinfrastructure Shell
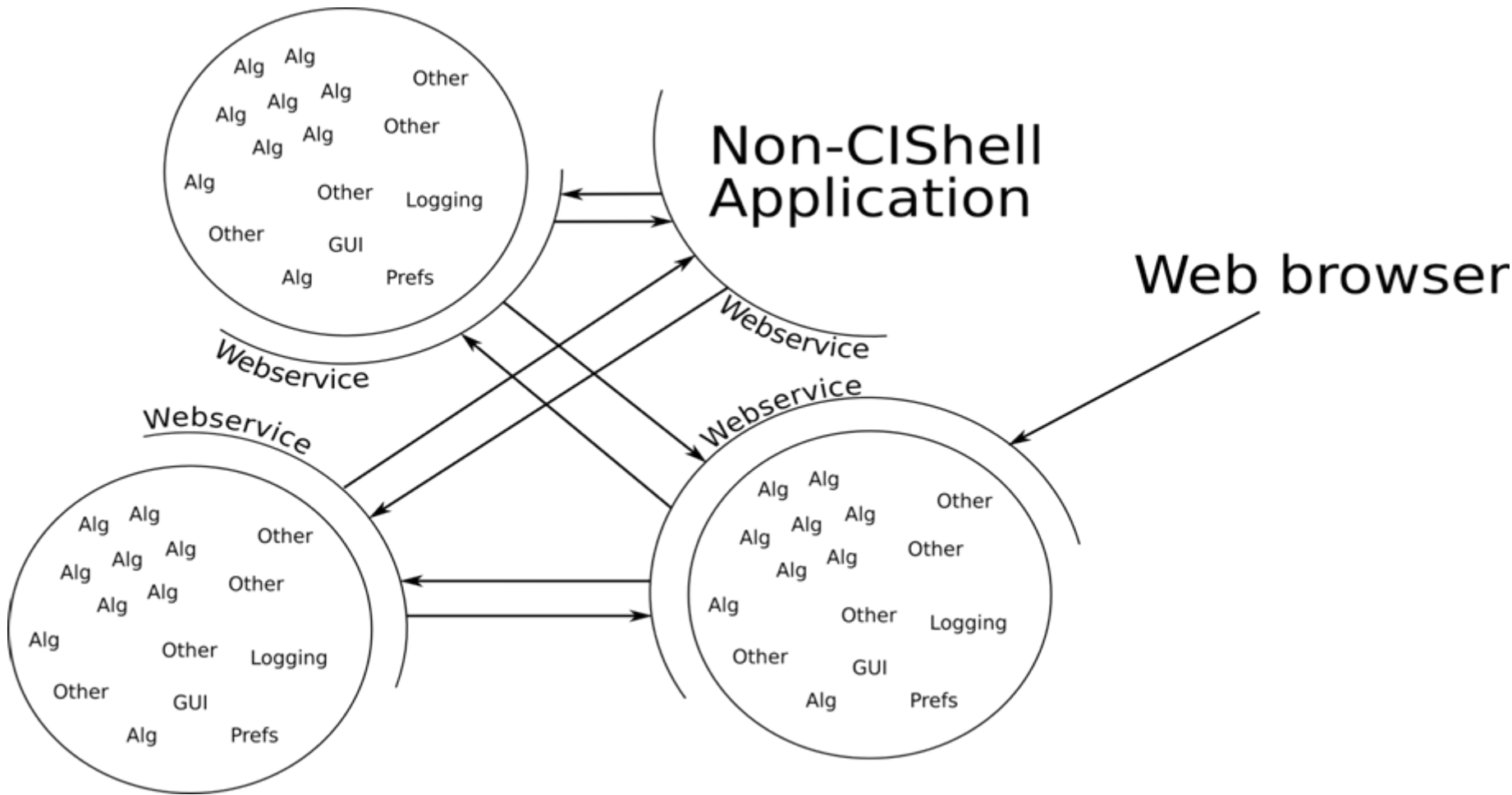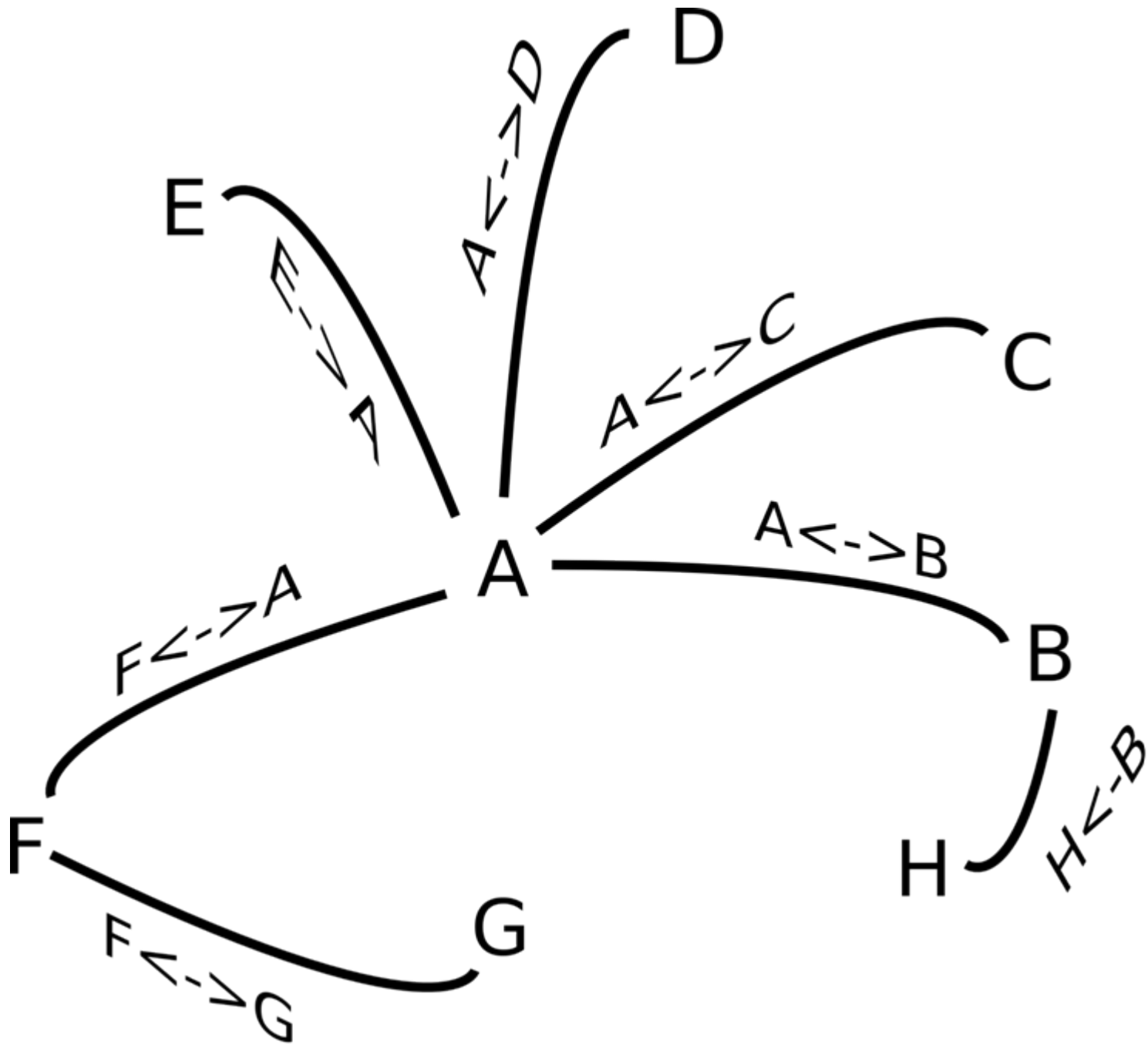
Bruce W. Herr
Information Visualization Laboratory
Cyberinfrastructure for Network Science Center
School of Library and Information Science
Indiana University, Bloomington, IN
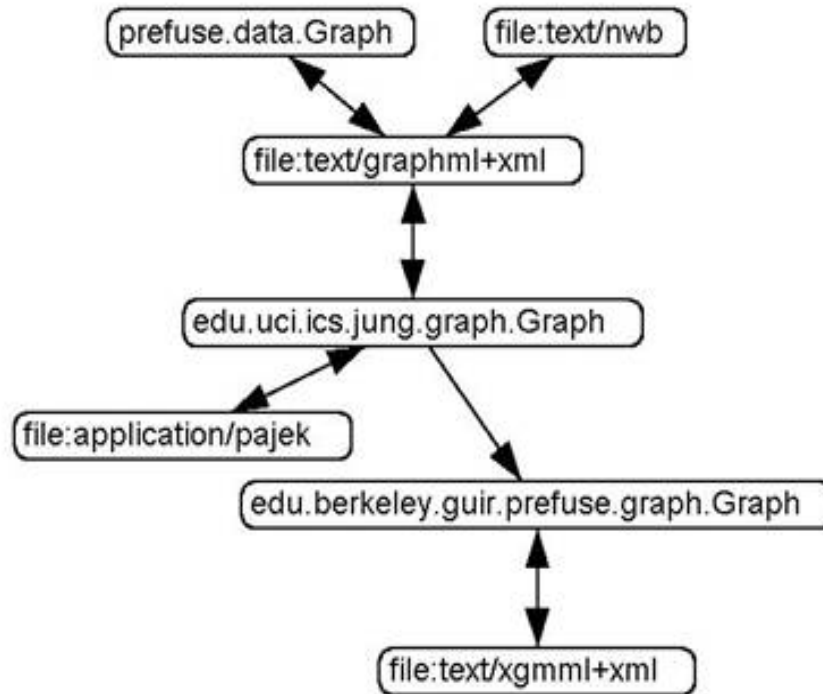bherr@indiana.edu

Network Workbench

A Workbench for Network Scientists

Network Workbench Tool

File   Preprocessing   Modeling   Analysis   Visualization   Help

Console

Measurement ▸   Global ▸   Shortest Path Distribution
Basic Process ▸ Local ▸   Site Betweenness
                                Page Rank
                                Error Tolerance
                                Diameter
                                Betweenness Centrality
                                Attack Tolerance
                                Connected Components
                                Average Shortest Path

....
Barabási-Albert Scale-Free was selected.
Author(s): A.-L. Barabási, R. Albert
Implementer(s): Santo Fortunato
Integrator(s): Santo Fortunato, Weixia Huang
Reference: Barabási, A-L. & Albert, R. (1999). Emergence of scaling in [...] ol 286, 509-512. (http://lanl.arxiv.or[...]
Docu: https://nwb.slis.indiana.edu/community/?n=ModelData.[...]

Input Parameters:
Links set by new node: 1
Number of nodes: 100
....
Kamada-Kawaii was selected.
Author(s): T. Kamada, S. Kawai,
Implementer(s): JUNG
Integrator(s): Weixia Huang
Reference: T. Kamada, S. Kawai,(1989). An algorithm for drawing general undirected graphs. Information Processing Letters, 31, 7-15.
Docu: https://nwb.slis.indiana.edu/community/?n=VisualizeData.Kamada-Kawaii
....
Watts-Strogatz Small World wa[...]
Author(s): D.J. Watts, S.H. Str[...]
Implementer(s): Santo Fortuna[...]
Integrator(s): Santo Fortunato
Reference: Watts, D.J. and Stro[...]   m.cornell.edu/SS_nature_smallworld.pdf)
Docu: https://nwb.slis.india[...]

Input Parameters:
Number of nodes: 100
Number of initial neighbors: 10
Rewiring probability: 0.1
....
Kamada-Kawaii was selected.
Author(s): T. Kamada, S. Kawa[...]
Implementer(s): JUNG
Integrator(s): Weixia Huang
Reference: T. Kamada, S. Kaw[...]
Docu: https://nwb.slis.india[...]
....
Load... was selected.
Loaded: /home/bherr/sfw/nwb/[...]
....
Page Rank was selected.
Author(s): S.Brin,L.Page
Implementer(s): Santo Fortuna[...]
Integrator(s): Santo Fortunato
Reference: Brin, S. and Page, [...]   nfor[...]
Docu: https://nwb.slis.india[...]

Input Parameters:
Number of bins: 10
Damping factor: 0.15
....
View... was selected.
....
Attack Tolerance was selected.
Author(s): R. Albert,H. Jeong, A.-L. Barabási
Integrator(s): Ramya Sabbineni
Reference: Albert, R., Jeong, H. and Barabási, A.-L. (2000). Error and attack tolerance in complex networks. Nature, 406:378 - 382.
Docu: https://nwb.slis.indiana.edu/community/?n=AnalyzeData.AttackTolerance

Input Parameters:
Number of Nodes: 10
....
Can was selected.
Author(s): S. Ratnasamy, P. Francis, M. Handley, R. Karp, S. Shenker.

Radial Graph Visualization

prefuse.data.Graph   file:text/nwb

file:text/graphml+xml

edu.uci.ics.jung.graph.Graph

file:application/pajek

edu.berkeley.guir.prefuse.graph.Graph

file:text/xgmml+xml

Data Manager

>List of edges of network created through the Barabasi-Albert mode[...]
>List of edges of network created through the Small World model.1
>Pajek .net file: /home/bherr/sfw/nwb/sampledata/Network/netsci06[...]
T >PageRank of the nodes of network at study.1
G >PageRank distribution for network at study.1
G >Binned PageRank distribution for network at study.1
>CAN Network Model..1
>Attack Tolerance.1

Kamada-Kawai Layout

*xxx-Session-29132.txt (/tmp/temp) - ge[...]

File   Edit   View   Search   Tools   Documents   Help

New   Open   Save   Print...   Undo   Redo   Cut

*xxx-Session-29132.txt

| # | Nodes | 168 |
| # | Node | \| PageRank |

1	0.350509E-02
2	0.673268E-02
3	0.350509E-02
4	0.350509E-02
5	0.350509E-02
6	0.350509E-02
7	0.350509E-02
8	0.350509E-02
9	0.350509E-02
10	0.350509E-02
11	0.350509E-02
12	0.350509E-02
13	0.350509E-02
14	0.350509E-02
15	0.350509E-02
16	0.350509E-02
17	0.350509E-02
18	0.350509E-02
19	0.350509E-02
20	0.383440E-01
21	0.350509E-02
22	0.350509E-02

Ln 2, Col 1   INS

Radial Graph Visualization

Non-CIShell
Application

Web browser

Webservice

Webservice

Webservice

Webservice

```
                prefuse.data.Graph              file:text/nwb


                            file:text/graphml+xml


                         edu.uci.ics.jung.graph.Graph


        file:application/pajek

                              edu.berkeley.guir.prefuse.graph.Graph


                                  file:text/xgmml+xml
```

https://nwb.slis.indiana.edu/events/ivsi2007/

Questions?

Network Workbench: http://nwb.slis.indiana.edu

Cyberinfrastructure Shell: http://cishell.org

IVSI Workshop: https://nwb.slis.indiana.edu/events/ivsi2007/