Jack Reilly

CRASH COURSE

Social Networks: Description and Visualization

Agenda

Why do we study social networks?

What are social networks?

How do we visualize networks in R?

Where can I go for more?

Learning outcomes

- When we're done, you should be able to:
  - **Describe social networks** using formal language
  - **Construct network data** for analysis and visualization
  - Use the **iGraph** library in R to draw and manipulate basic networks
    - Know where to go for other options

Part One

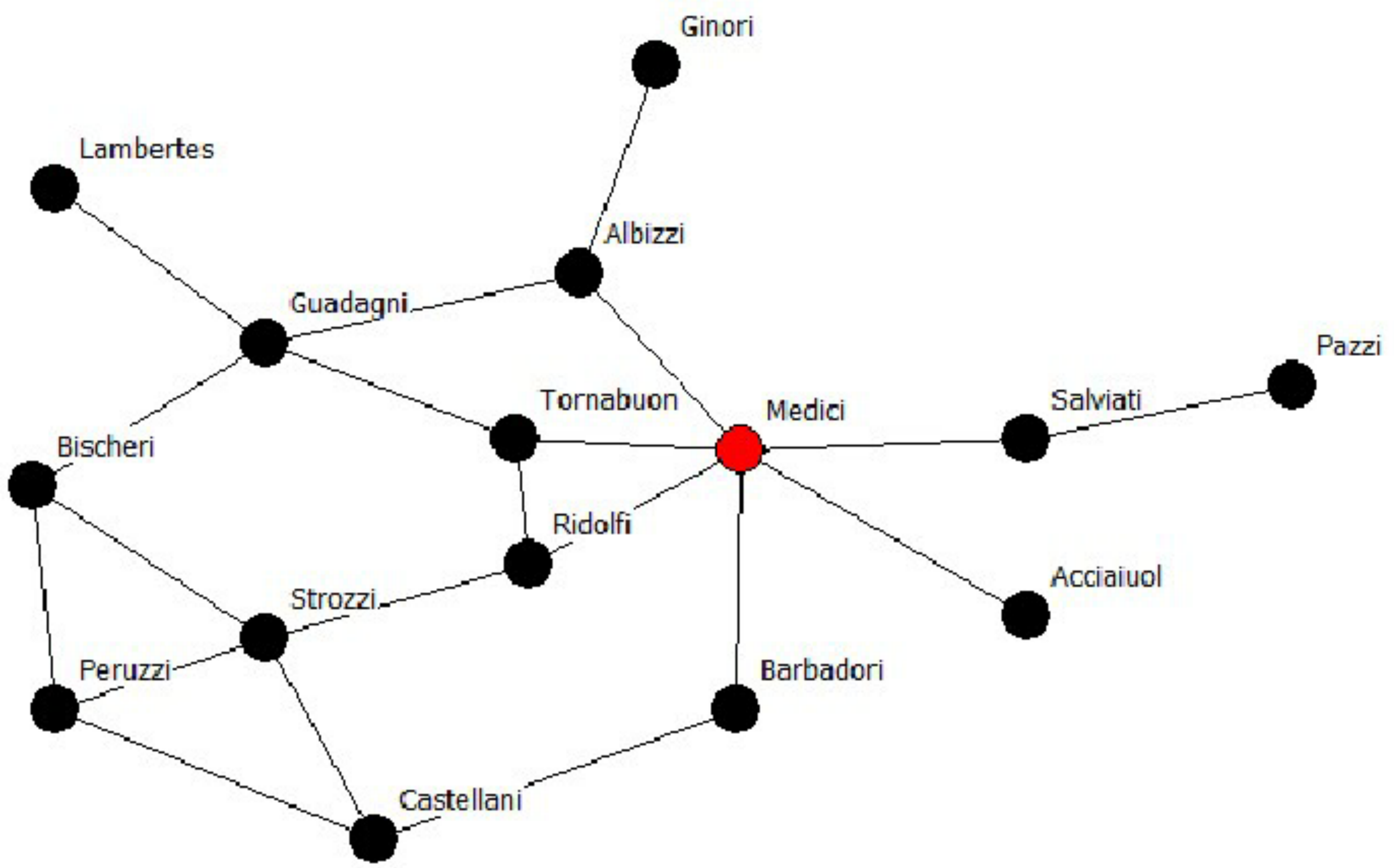
Why do we study social networks?

#1

Social network connections can tell us valuable things about how individual actors behave and perform

Networks in politics and history

- Why did the Medici emerge to be so powerful? (Padgett & Ansell, 1993)



The Medici Marriage Network

Padgett, J. F., & Ansell, C. K. (1993). "Robust Action and the Rise of the Medici, 1400-1434." American Journal of Sociology, 98(6), 1259-1319.

Networks in politics and history

- Why was medieval Constantinople so rich, even after and as the Roman empire crumbled?

There are characteristics of the ***city***
and the city's ***network***

Sources; wikipedia (https://en.wikipedia.org/wiki/Constantinople#/media/File:Byzantine_Constantinople-en.png);

Networks in politics and history

- Why was medieval Constantinople so rich, even after and as the Roman empire crumbled?

#2

Social networks help illuminate complex collective dynamics of human behavior that emerge and cascade unexpectedly

Bird behavior or human behavior?

- Collective network dynamics yield complex human behavior, as well
  - Why do riots start in some towns but not others? (Granovetter 1978)
    - *Because someone needs to throw the first stone*
  - Why do some musical artists become popular and others done? (Salganik, Dodds, and Watts 2006)
    - *Talent, but also network popularity effects*
  - Why do some news stories "go viral" and others don't? (Boydstun, Walgrave, and Hardy 2014; Nahon & Hemsly 2013)

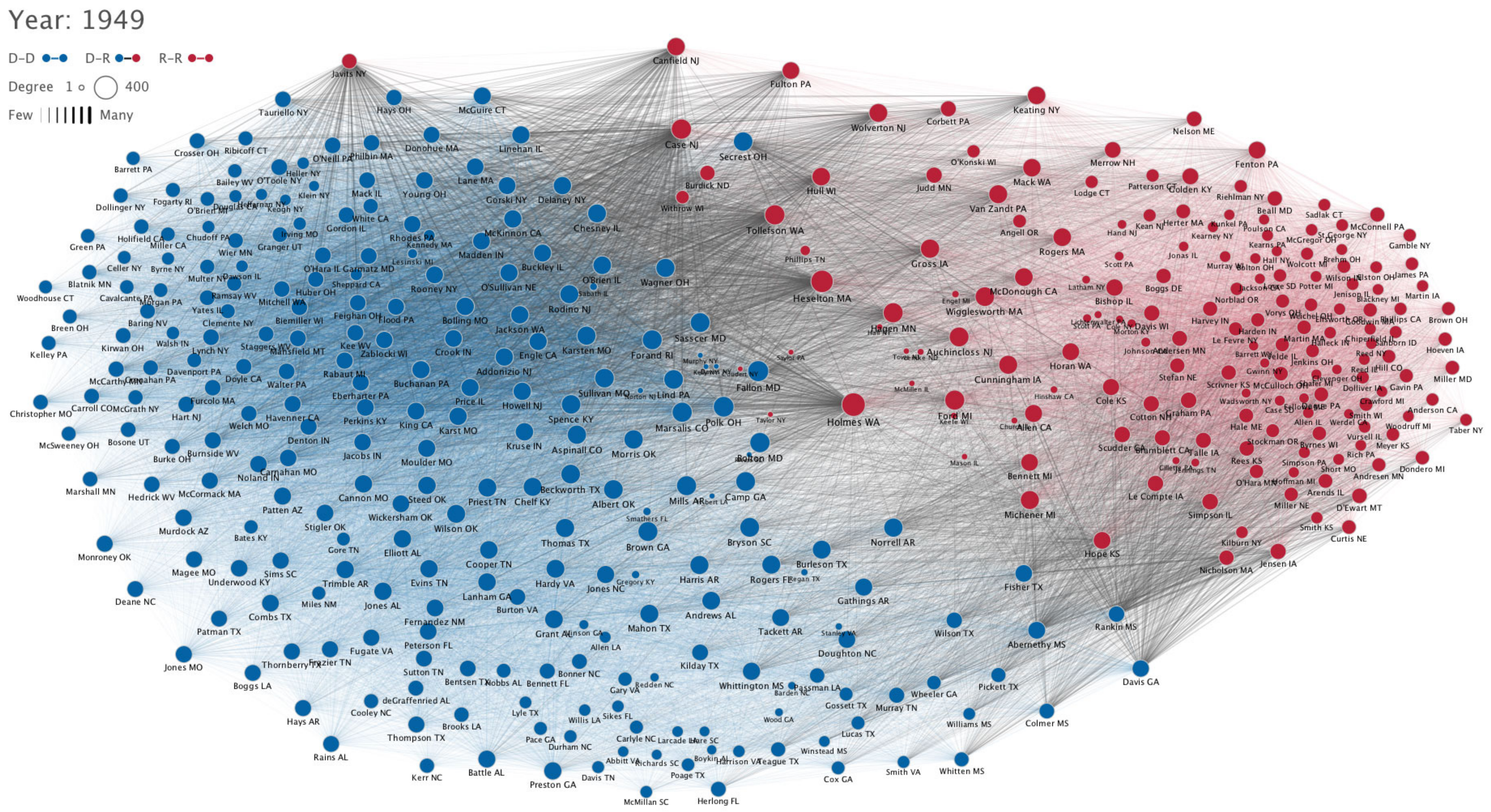
#3

The macro structure of social networks can tell us important things about large scale changes and continuity in society

A contemporary story: Polarization

- Specifically, polarization in the United States House of Representatives
  - Based on roll call data, we can see how often different pairs (or “dyads”) of legislators agree
  - For all pairs of legislators:
    - Votes in common (both “aye” or both “nay”) increased the agreement score
    - Votes not in common (one “aye” and one “nay”) decreased the agreement score
- What does it look like? And does it change?

Andris C, Lee D, Hamilton MJ, Martino M, Gunning CE, Selden JA (2015) The Rise of Partisanship and Super-Cooperators in the U.S. House of Representatives. PLoS ONE 10(4): e0123507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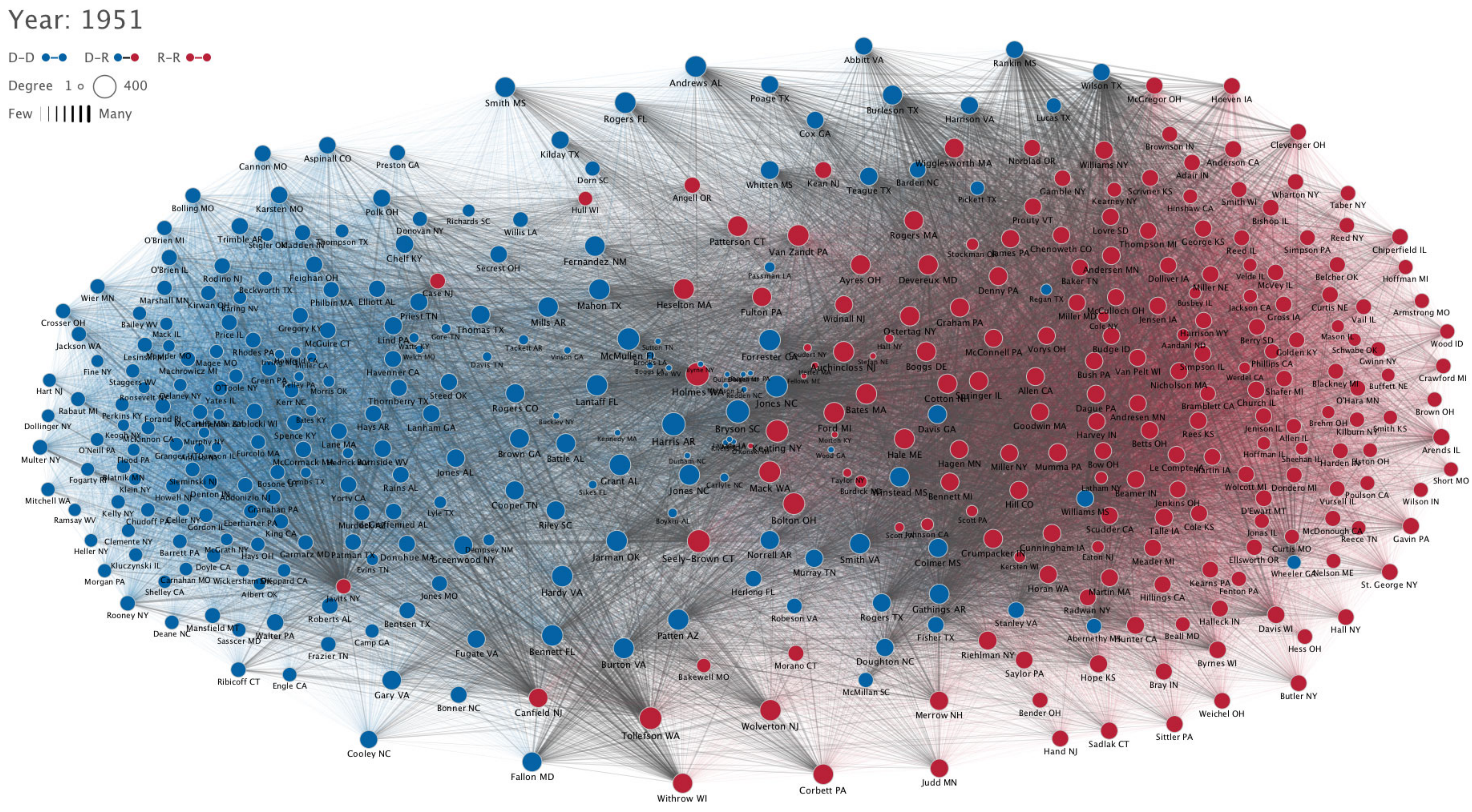
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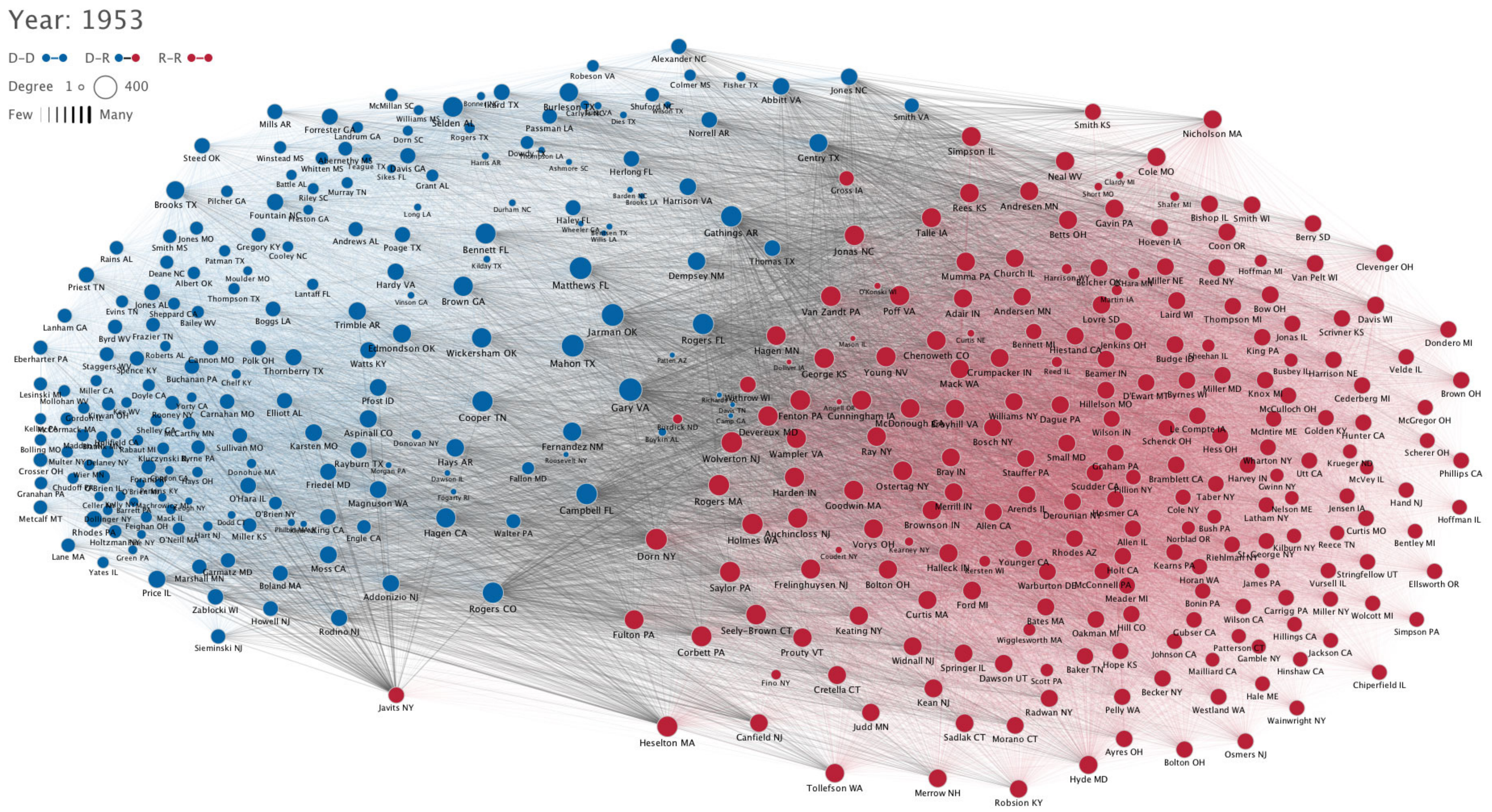
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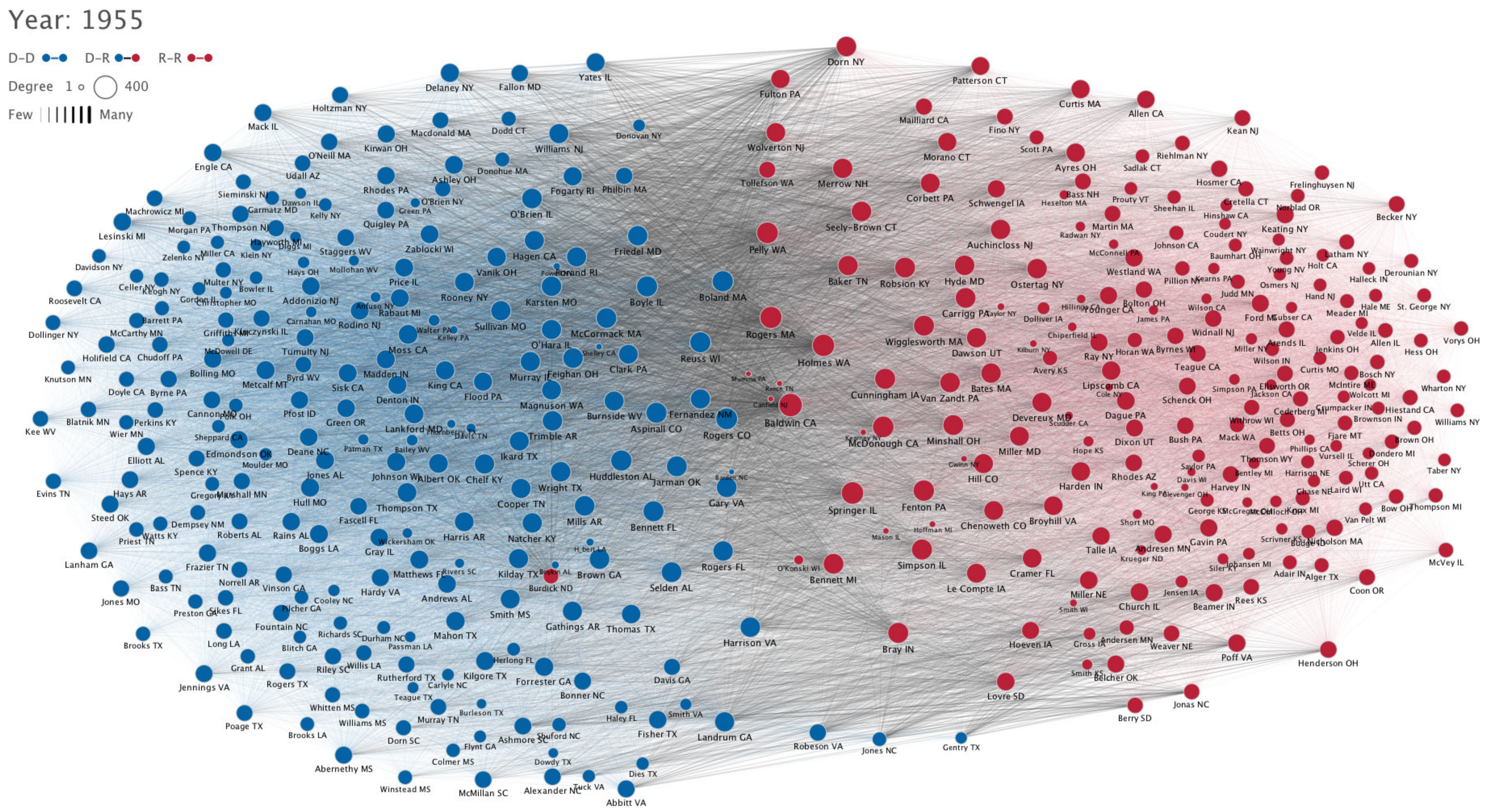

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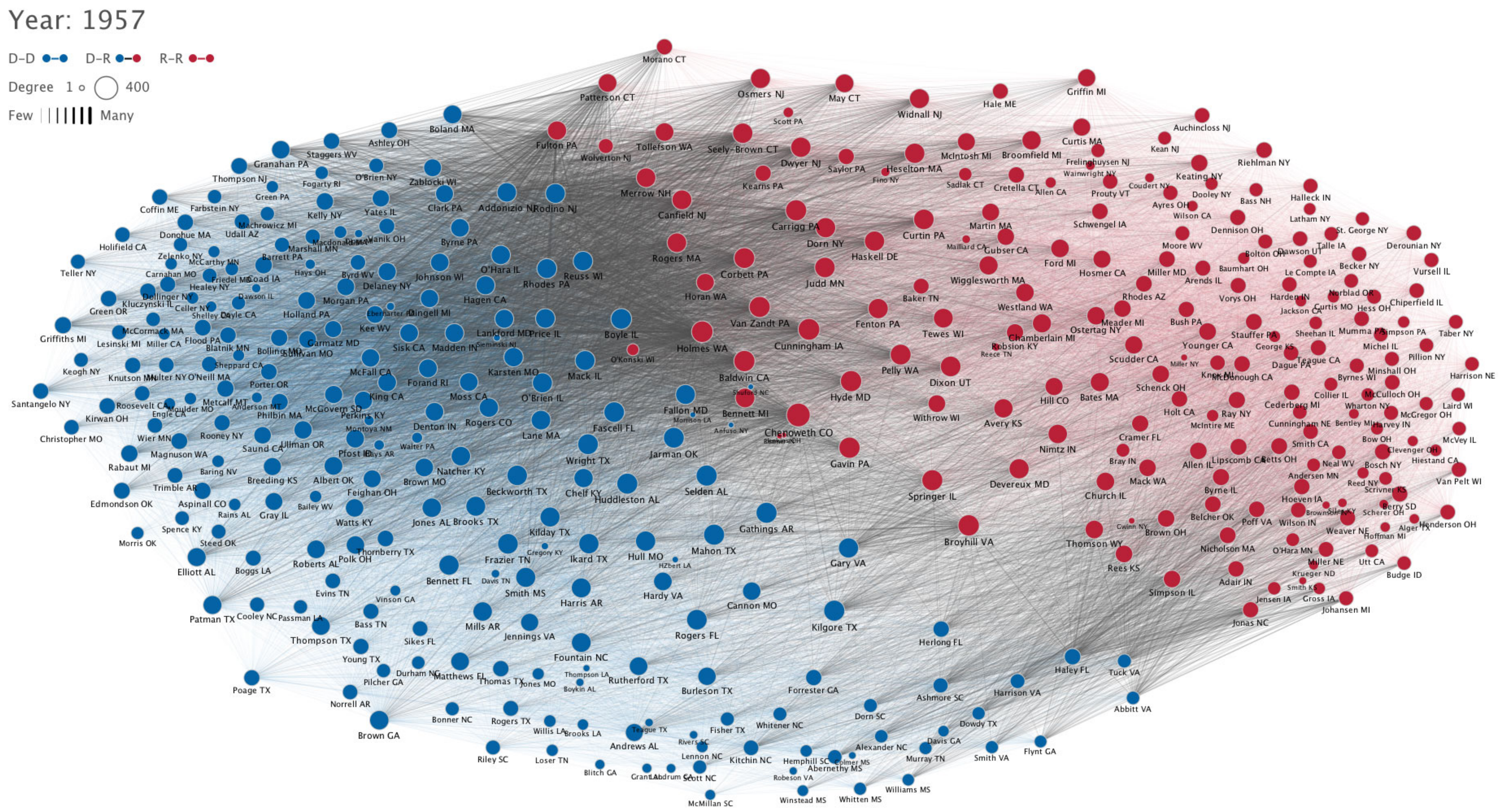
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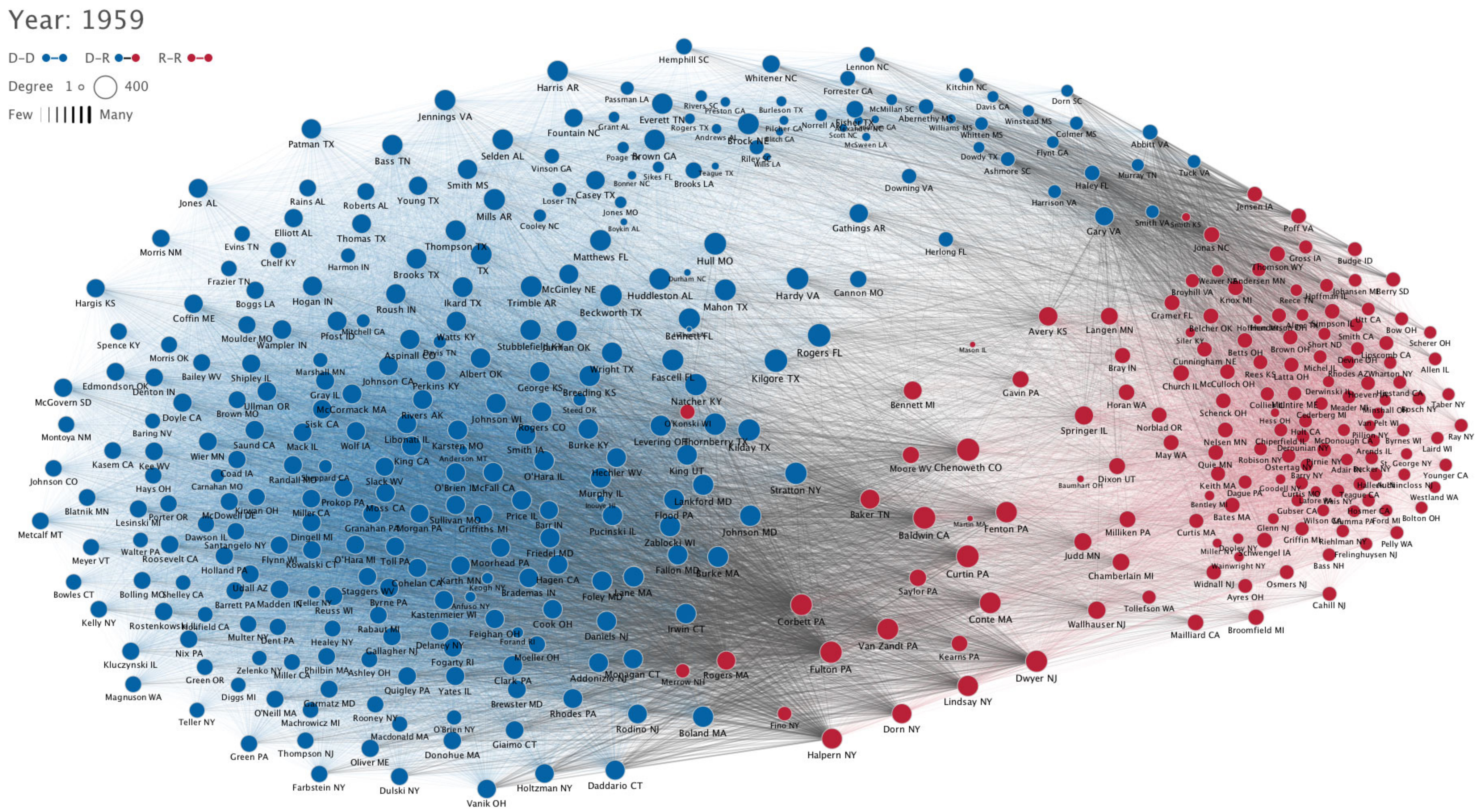
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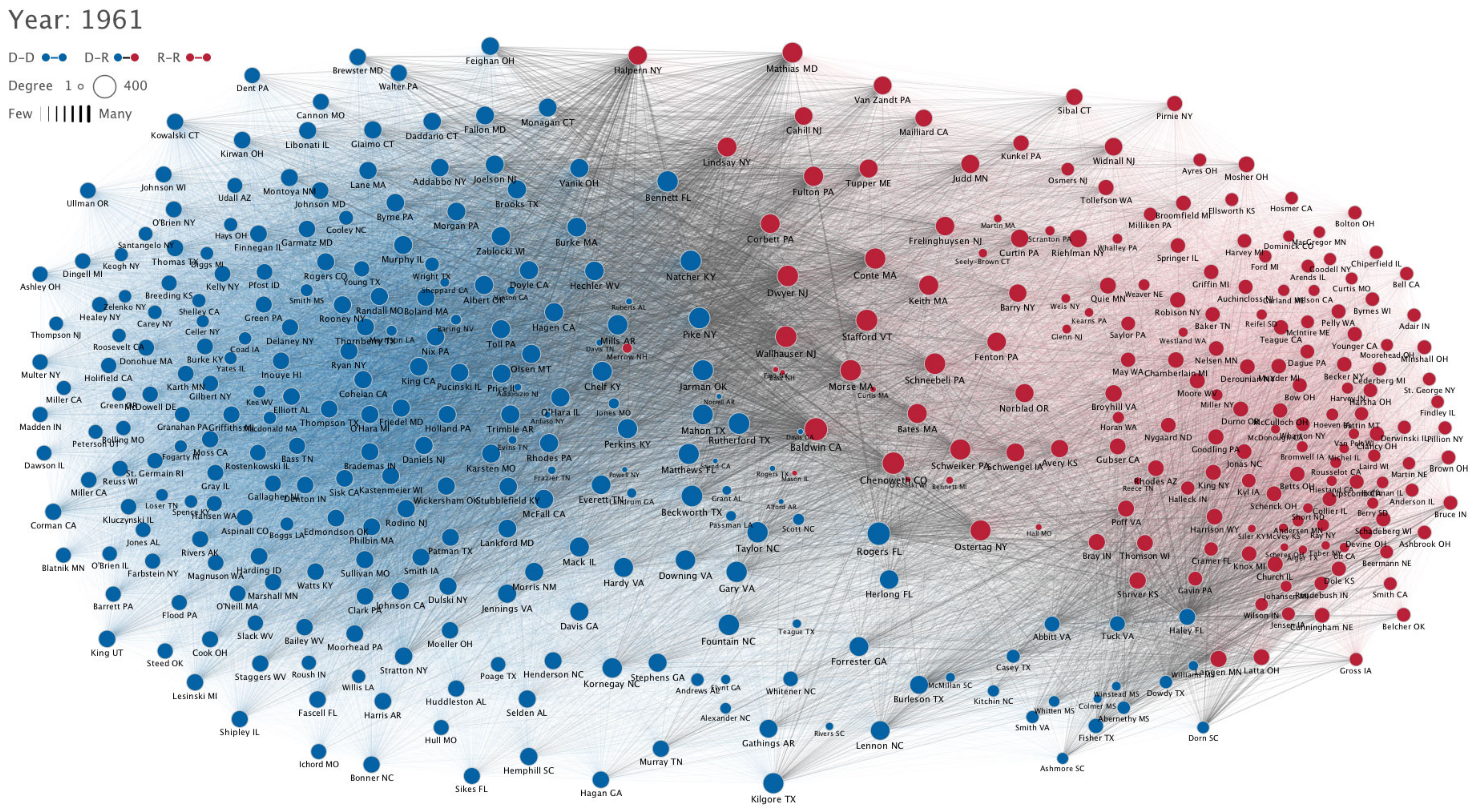
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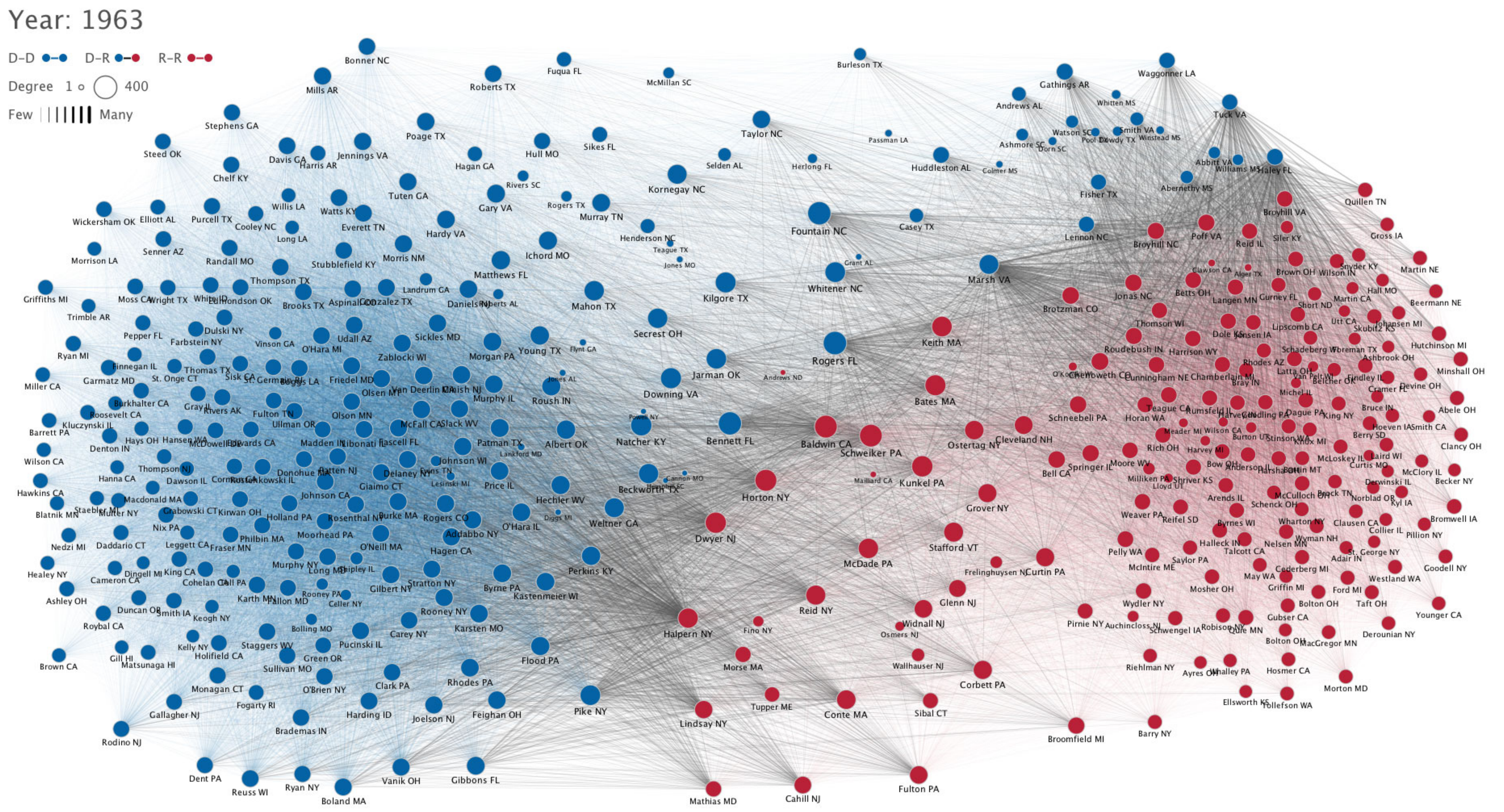
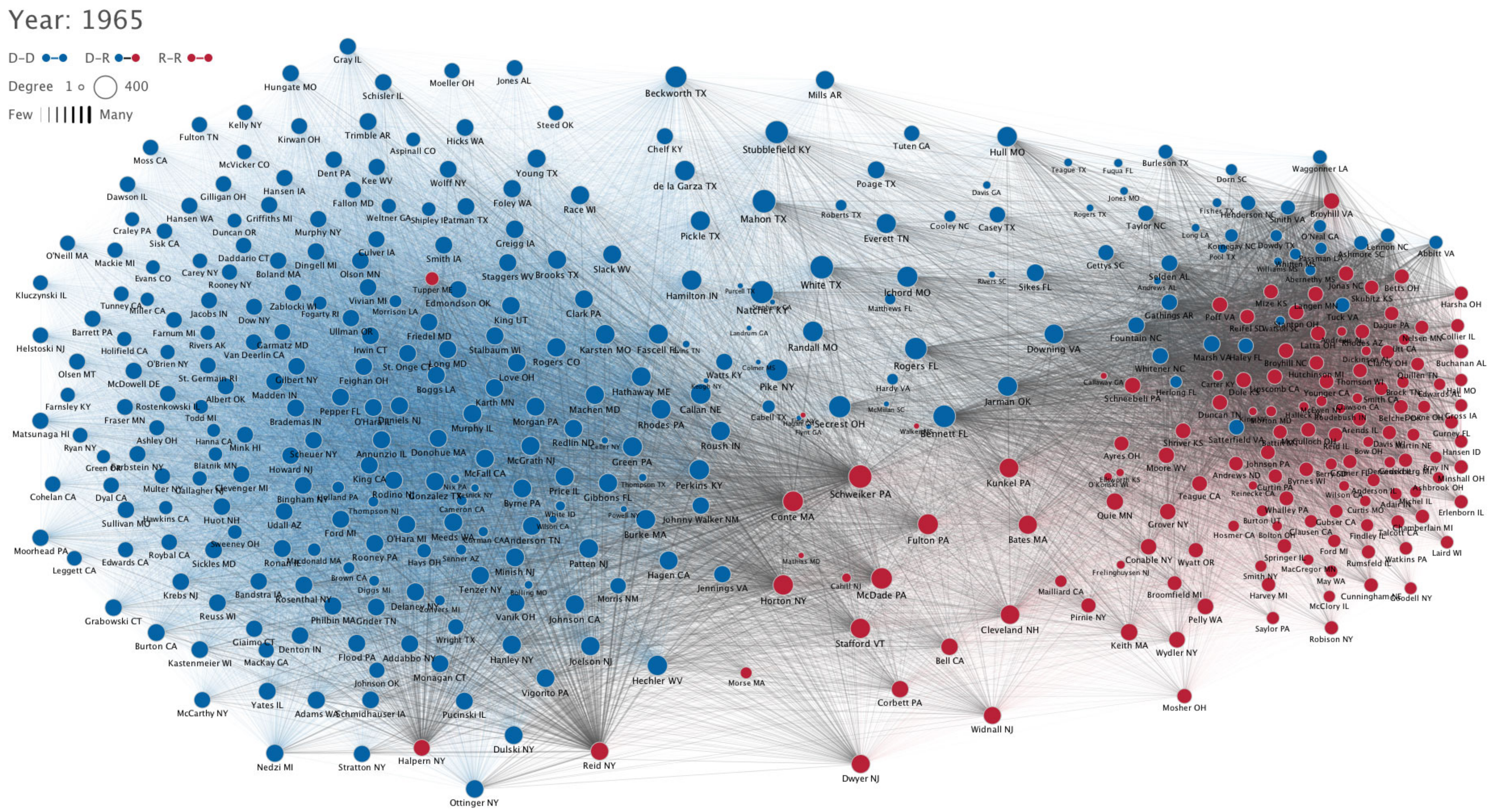
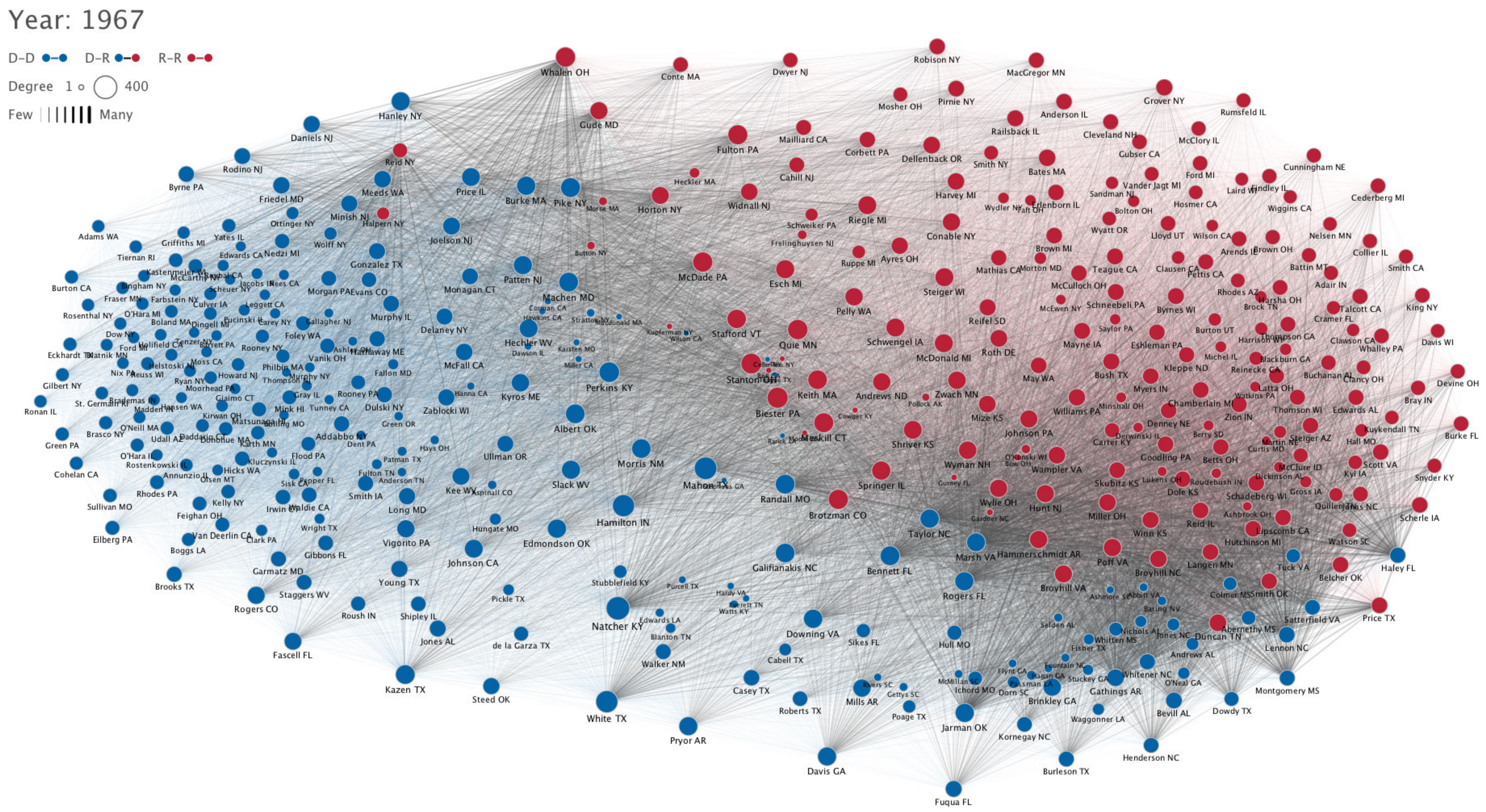
Harris AR
Huddleston AL
Selden AL
Colmer MS
Whitten MS
Abernethy MS
Shipley IL
Alexander NC
Smith VA
Hull MO
Gathings AR
Rivers SC
Lennon NC
Fisher TX
Dorn SC
Ichord MO
Bonner NC
Murray TN
Ashmore SC
Sikes FL
Hemphill SC
Hagan GA
Kilgore TX



Year: 1963
D–D
D–R
R–R
Degree 1
400
Few
Many
Bonner NC
Mills AR
Roberts TX
Fuqua FL
McMillan SC
Burleson TX
Gathings AR
Waggonner LA
Andrews AL
Whitten MS
Tuck VA
Stephens GA
Poage TX
Taylor NC
Passman LA
Steed OK
Davis GA
Harris AR
Jennings VA
Hagan GA
Hull MO
Sikes FL
Selden AL
Herlong FL
Huddleston AL
Colmer MS
Abbitt VA
Williams MS
Haley FL
Chelf KY
Tuten GA
Rivers SC
Kornegay NC
Fisher TX
Abernethy MS
Quillen TN
Wickersham OK
Elliott AL
Purcell TX
Cooley NC
Willis LA
Watts KY
Everett TN
Hardy VA
Gary VA
Rogers TX
Murray TN
Henderson NC
Fountain NC
Casey TX
Lennon NC
Broyhill NC
Poff VA
Reid IL
Broyhill VA
Gross IA
Morrison LA
Senner AZ
Randall MO
Long LA
Stubblefield KY
Morris NM
Ichord MO
Matthews FL
Thompson TX
Landrum GA
Mahon TX
Kilgore TX
Whitener NC
Marsh VA
Martin NE
Griffiths MI
Moss CA
Wright TX
Brooks TX
Daniels NJ
Secrest OH
Brotzman CO
Jonas NC
Betts OH
Trimble AR
Pepper FL
Dulski NY
Farbstein NY
Vinson GA
O'Hara MI
Udall AZ
Sickles MD
Zablocki WI
Morgan PA
Young TX
Keith MA
Thomson WI
Rogers FL
Jarman OK
Ryan MI
Finnegan IL
Thomas TX
St. Onge CT
Garmatz MD
Miller CA
Friedel MD
Downing VA
Bates MA
Roudebush IN
Harrison WY
Chamberlain MI
Burkhalter CA
Rivers AK
Gray IL
Fulton TN
Olson MN
McFall CA
Slack WV
Murphy IL
Roush IN
Roosevelt CA
Kluczynski IL
Barrett PA
Denton IN
Hays OH
Ullman OR
Madden IN
Fascell FL
Patman TX
Albert OK
Natcher KY
Bennett FL
Baldwin CA
Schweiker PA
Ostertag NY
Cleveland NH
Schneebeli PA
Horan WA
Wilson CA
Hanna CA
Dawson IL
Donohue MA
Johnson WI
Price IL
Delaney NY
Gaimo CT
Hechler WV
Beckworth TX
Horton NY
Kunkel PA
Bell CA
Springer IL
Moore WV
Hawkins CA
Blatnik MN
Macdonald MA
Grabowski CT
Kirwan OH
Holland PA
Rosenthal NY
Burke MA
Rogers CO
O'Hara IL
Weltner GA
Dwyer NJ
Grover NY
Nix PA
Philbin MA
Moorhead PA
Addabbo NY
Stafford VT
McDade PA
Curtin PA
Nedzi MI
Daddario CT
Leggett CA
Fraser MN
O'Neill MA
Hagen CA
Healey NY
Dingell MI
King CA
Murphy NY
Long MD
Shipley IL
Perkins KY
Cameron CA
Cohelan CA
Hall PA
Gilbert NY
Stratton NY
Byrne PA
Kastenmeier WI
Glenn NJ
Ashley OH
Karth MN
Fallon MD
Rooney PA
Celler NY
Reid NY
Duncan OR
Smith IA
Keogh NY
Rooney NY
Karsten MO
Halpern NY
Fino NY
Widnall NJ
Osmers NJ
Roybal CA
Bolling MO
Carey NY
Kelly NY
Staggers WV
Pucinski IL
Gill HI
Holifield CA
Matsunaga HI
Green OR
Flood PA
Morse MA
Wallhauser NJ
Corbett PA
Brown CA
Sullivan MO
Monagan CT
O'Brien NY
Clark PA
Rhodes PA
Fogarty RI
Gallagher NJ
Harding ID
Joelson NJ
Feighan OH
Pike NY
Lindsay NY
Tupper ME
Conte MA
Sibal CT
Brademas IN
Broomfield MI
Barry NY
Rodino NJ
Dent PA
Reuss WI
Ryan NY
Boland MA
Vanik OH
Gibbons FL
Mathias MD
Cahill NJ
Fulton PA
Younger CA
Derounian NY
Morton MD
Riehlman NY
Hosmer CA
Ellsworth KS
Tollefson WA
Goodell NY
Westland WA
Taft OH
Bolton OH
Gubser CA
MacGregor MN
Pelly WA
McIntire ME
Saylor PA
Mosher OH
Wydler NY
Pirnie NY
Auchincloss NJ
Schwengel IA
Quie MN
Bromwell IA
Pillion NY
Clancy OH
Abele OH
Minshall OH
Hutchinson MI
Beermann NE
Becker NY
McClory IL
Weaver PA
Reifel SD
Arends IL
Halleck IN
Talcott CA
Nelsen MN
Wyman NH
Adair IN
St. George NY
Griffin MI
Ford MI
May WA
Cederberg MI
Frelinghuysen NJ


Year: 1965
D–D
D–R
R–R
Degree 1 400
Few Many
Gray IL
Hungate MO
Schisler IL
Moeller OH
Jones AL
Beckworth TX
Mills AR
Kelly NY
Fulton TN
Kirwan OH
Trimble AR
Hicks WA
Steed OK
Chelf KY
Stubblefield KY
Tuten GA
Hull MO
Burleson TX
Moss CA
McVicker CO
Aspinall CO
Dent PA
Kee WV
Wolff NY
Young TX
de la Garza TX
Poage TX
Teague TX
Fuqua FL
Dorn SC
Waggonner LA
Dawson IL
Gilligan OH
Hansen IA
Fallon MD
Foley WA
Race WI
Mahon TX
Davis GA
Jones MO
Hansen WA
Griffiths MI
Weltner GA
Shipley IL
Patman TX
Murphy NY
Roberts TX
Cooley NC
Casey TX
Rogers TX
Taylor NC
Fisher TX
Henderson NC
Smith VA
Broyhill VA
Craley PA
Duncan OR
Sisk CA
Greigg IA
Pickle TX
Everett TN
Long LA
O'Neal GA
Kornegay NC
Dowdy TX
Lennon NC
Abbitt VA
O'Neill MA
Mackie MI
Daddario CT
Culver IA
Smith IA
Pool TX
Passman LA
Ashmore SC
Evans CO
Carey NY
Boland MA
Dingell MI
Olson MN
Staggers WV
Brooks TX
Slack WV
Gettys SC
Whitten MS
Williams MS
Abernethy MS
Rooney NY
Tupper ME
White TX
Rivers SC
Sikes FL
Selden AL
Andrews AL
Jonas NC
Betts OH
Kluczynski IL
Tunney CA
Miller CA
Zablocki WI
Vivian MI
Edmondson OK
Hamilton IN
Purcell TX
Ichord MO
Matthews FL
Mize KS
Harsha OH
Jacobs IN
Fogarty RI
Morrison LA
King UT
Clark PA
Natcher KY
Stephens GA
Langen MN
Skubitz KS
Gathings AR
Poff VA
Tuck VA
Barrett PA
Farnum MI
Dow NY
Ullman OR
Friedel MD
Landrum GA
Reifel SD
Watson SC
Dague PA
Nelsen MN
Collier IL
Helstoski NJ
Holifield CA
Rivers AK
Carmatz MD
Irwin CT
Stalbaum WI
Karsten MO
Fascell FL
Evins TN
Randall MO
Rogers FL
Downing VA
Fountain NC
Latta OH
Andrews ND
Rhodes AZ
Utt CA
Olsen MT
O'Brien NY
Van Deerlin CA
St. Onge CT
Long MD
Rogers CO
Colmer MS
Marsh VA
Haley FL
Broyhill NC
Dickinson AL
Clancy OH
Buchanan AL
McDowell DE
St. Germain RI
Gilbert NY
Feighan OH
Love OH
Watts KY
Whitener NC
Hutchinson MI
Thomson WI
Quillen TN
Albert OK
Madden IN
Boggs LA
Hathaway ME
Pike NY
Keogh NY
Hardy VA
Callaway GA
Carter KY
Dole KS
Lipscomb CA
Younger CA
Brock TN
Edwards AL
Hall MO
Farnsley KY
Rostenkowski IL
Pepper FL
Karth MN
Machen MD
Callan NE
Jarman OK
Herlong FL
Schneebeli PA
Smith CA
Fraser MN
Todd MI
Brademas IN
O'Hara IL
Daniels NJ
Morgan PA
Cabell TX
McMillan SC
Duncan TN
McEwen NY
Dawson CA
Matsunaga HI
Hanna CA
Murphy IL
Rhodes PA
Hagan GA
Secrest OH
Bennett FL
Morton MD
Roudebush IN
Belcher OK
Devine OH
Gross IA
Ryan NY
Ashley OH
Mink HI
Scheuer NY
Annunzio IL
Donohue MA
Redlin ND
Celler NY
Flynt GA
Walker MS
Satterfield VA
Battin MT
McCulloch OH
Arends IL
Davis WI
Martin NE
Gurney FL
Green OR
Farbstein NY
Blatnik MN
Howard NJ
McGrath NJ
Green PA
Roush IN
Shriver KS
Ayres OH
Moore WV
Reid IL
Bow OH
Hansen ID
King CA
McFall CA
Johnson PA
Andrews ND
Gubser CA
Derwinski IL
Bray IN
Minshall OH
Cohelan CA
Dyal CA
Multer NY
Gallagher NJ
Clevenger MI
Holland PA
Rodino NJ
Gonzalez TX
Nix PA
Resnick NY
Price IL
Gibbons FL
Thompson TX
Perkins KY
Schweiker PA
Kunkel PA
O'Konski WI
Ellsworth KS
Teague CA
Reinecke CA
Curtin PA
Byrnes WI
Anderson IL
Ashbrook OH
Wilson CA
Adair IN
Michel IL
Bingham NY
Thompson NJ
Cameron CA
Byrne PA
White ID
Powell NY
Conte MA
Quie MN
Grover NY
Whalley PA
Curtis MO
Erlenborn IL
Sullivan MO
Hawkins CA
Huot NH
Udall AZ
Ford MI
O'Hara MI
Meeds WA
Wilson CA
Johnny Walker NM
Burke MA
Fulton PA
Bates MA
Burton UT
Bolton OH
Clausen CA
Findley IL
Talcott CA
Chamberlain MI
Moorhead PA
Sweeney OH
Roybal CA
Corman CA
Anderson TN
Hosmer CA
Ford MI
Laird WI
Edwards CA
Sickles MD
Ronan IL
Macdonald MA
Rooney PA
Hays OH
Senner AZ
Minish NJ
Patten NJ
Hagen CA
Mathias MD
Conable NY
Wyatt OR
Springer IL
MacGregor MN
Rumsfeld IL
Watkins PA
Leggett CA
Krebs NJ
Bandstra IA
Brown CA
Diggs MI
Tenzer NY
Bolling MO
Morris NM
Jennings VA
Horton NY
Cahill NJ
McDade PA
Frelinghuysen NJ
Mailliard CA
Broomfield MI
Smith NY
May WA
Cunningham NE
Goodell NY
Reuss WI
Rosenthal NY
Delaney NY
Conyers MI
Vanik OH
Johnson CA
Pirnie NY
Pelly WA
Harvey MI
McClory IL
Grabowski CT
Philbin MA
Grider TN
Cleveland NH
Saylor PA
Burton CA
Giaimo CT
Denton IN
Wright TX
Stafford VT
Keith MA
Wydler NY
Robison NY
Kastenmeier WI
MacKay CA
Flood PA
Addabbo NY
Hanley NY
Joelson NJ
Bell CA
Johnson OK
Monagan CT
Hechler WV
Morse MA
Vigorito PA
Corbett PA
Yates IL
McCarthy NY
Adams WA
Schmidhauser IA
Pucinski IL
Widnall NJ
Mosher OH
Dulski NY
Nedzi MI
Stratton NY
Halpern NY
Reid NY
Dwyer NJ
Ottinger NY



Year: 1967
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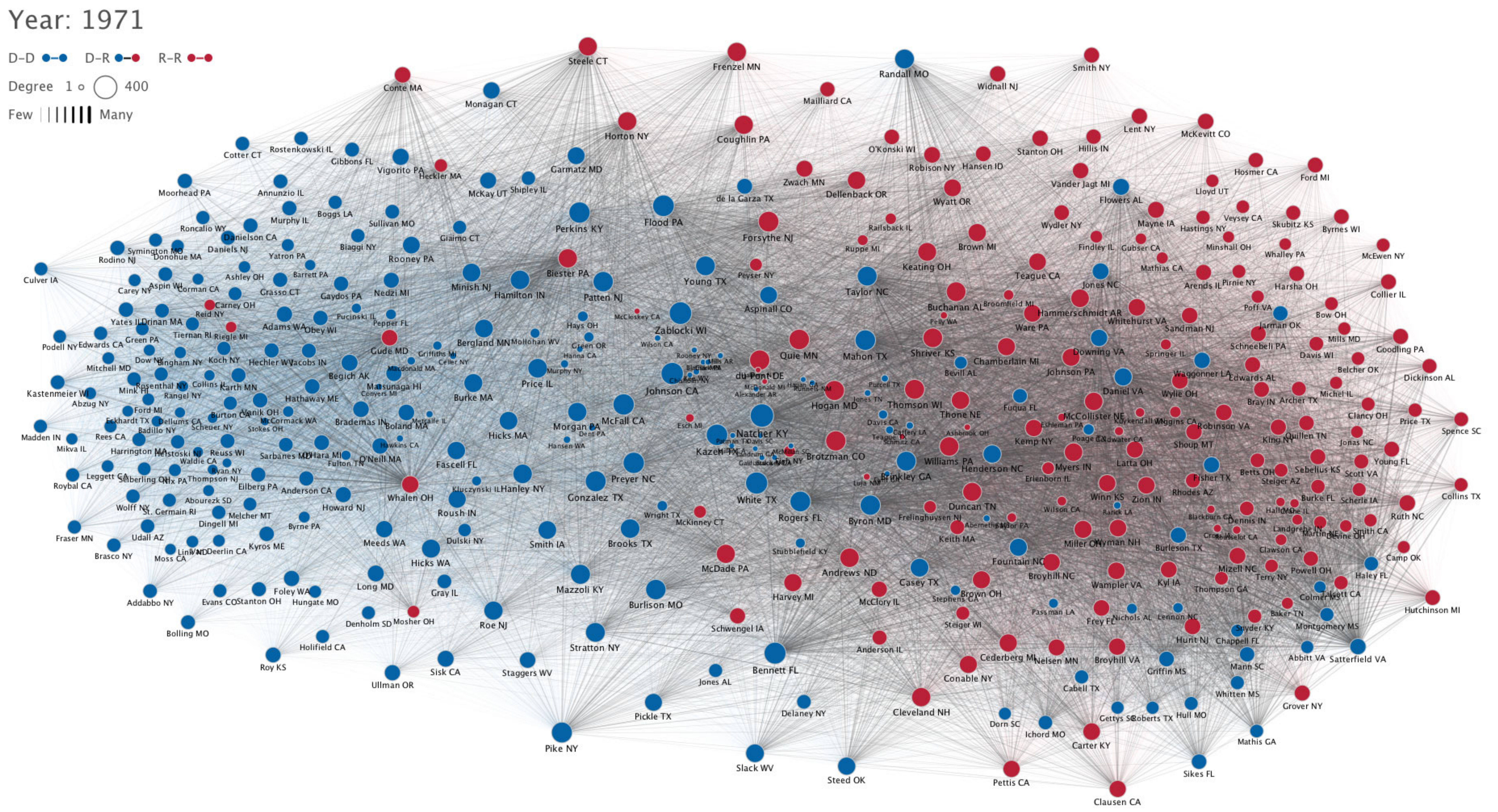
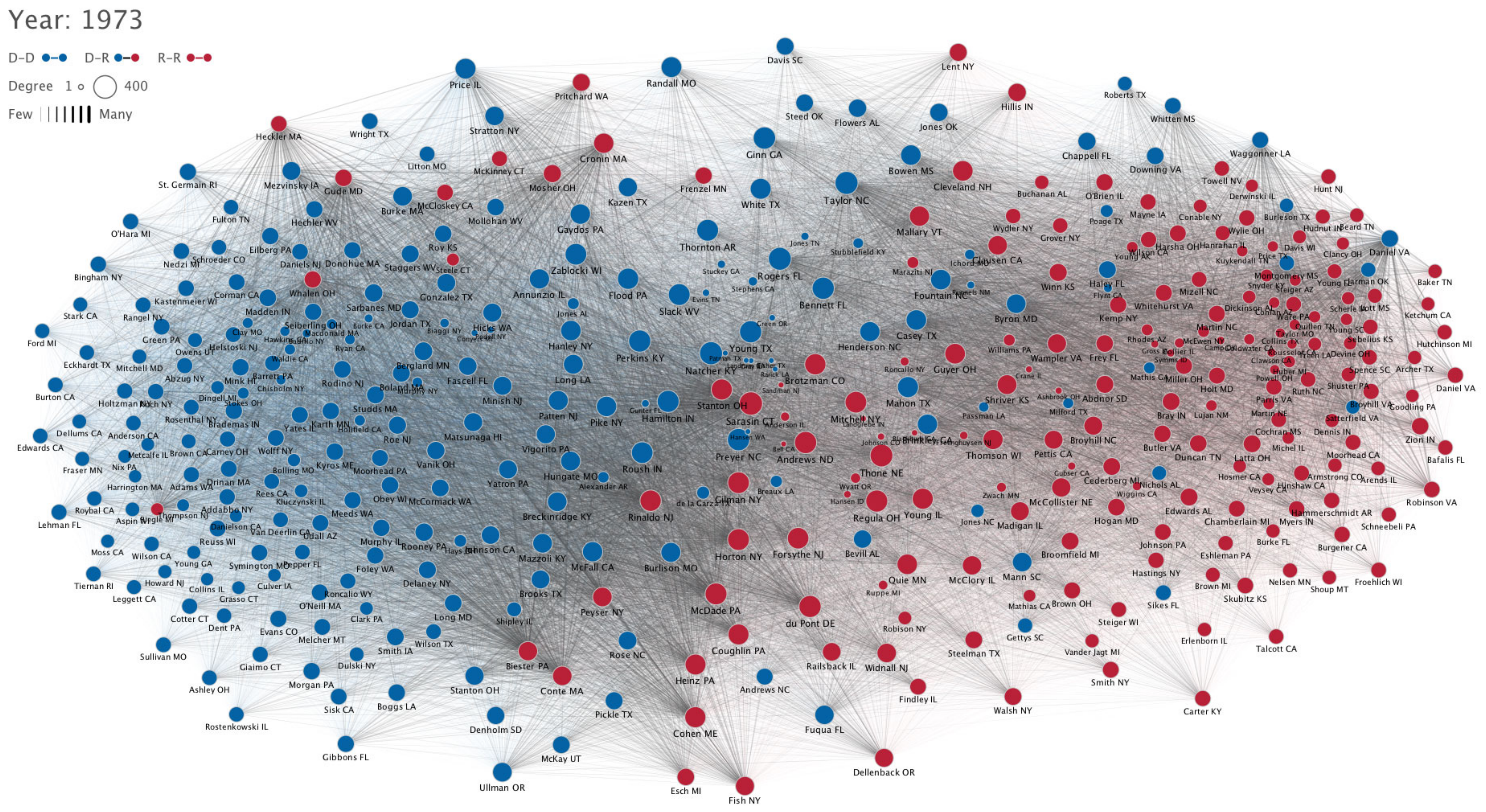
D–R
R–R
Degree 1
400
Few
Many
Whalen OH
Conte MA
Dwyer NJ
Robison NY
MacGregor MN
Mosher OH
Pirnie NY
Grover NY
Rumsfeld IL
Hanley NY
Gude MD
Anderson IL
Daniels NJ
Fulton PA
Mailliard CA
Railsback IL
Cleveland NH
McClory IL
Reid NY
Corbett PA
Dellenback OR
Gubser CA
Rodino NJ
Smith NY
Bates MA
Ford MI
Cunningham NE
Byrne PA
Friedel MD
Meeds WA
Price IL
Burke MA
Pike NY
Heckler MA
Cahill NJ
Harvey MI
Sandman NJ
Vander Jagt MI
Laird WI
Findley IL
Cederberg MI
Horton NY
Widnall NJ
Minish NJ
Morse MA
Wydler NY
Taft OH
Erlenborn IL
Hosmer CA
Wiggins CA
Adams WA
Ottinger NY
Halpern NY
Joelson NJ
Schweiker PA
Riegle MI
Bolton OH
Wyatt OR
Griffiths MI
Yates IL
Wolff NY
Frelinghuysen NJ
Conable NY
Lloyd UT
Wilson CA
Nelsen MN
Collier IL
Tiernan RI
Edwards CA
Nedzi MI
Gonzalez TX
Button NY
Ruppe MI
Ayres OH
Brown MI
Arends IL
Brown OH
Smith CA
Battin MT
McDade PA
Mathias CA
Morton MD
Teague CA
Clausen CA
Pettis CA
Burton CA
Bingham NY
Patten NJ
Esch MI
Steiger WI
McCulloch OH
Rhodes AZ
Adair IN
Morgan PA
Evans CO
Monagan CT
Machen MD
Harsha OH
Fraser MN
Farbstein NY
Culver IA
Leggett CA
Pelly WA
Schneebeli PA
Byrnes WI
Brock TN
Talcott CA
King NY
Rosenthal NY
O'Hara MI
Murphy IL
Reifel SD
McEwen NY
Cramer FL
Boland MA
Dingell MI
Pucinski IL
Carey NY
Gallagher NJ
Delaney NY
Stafford VT
Saylor PA
Burton UT
Dow NY
Foley WA
Quie MN
Schwengel IA
Mayne IA
Harrison WY
Thompson GA
Clawson CA
Davis WI
Eckhardt TX
Ford MI
Holifield CA
Barrett PA
Rooney NY
Hathaway ME
Hechler WV
McDonald MI
Roth DE
Eshleman PA
Whalley PA
Blatnik MN
Vanik OH
Dawson IL
Karsten MO
Michel IL
Blackburn GA
Gilbert NY
Moss CA
Philbin MA
Fallon MD
McFall CA
Miller CA
Kleppe ND
Reinecke CA
Buchanan AL
Clancy OH
Devine OH
Nix PA
Helstoski NJ
Reuss WI
Howard NJ
Murphy NY
Thompson NJ
Stanton OH
Keith MA
Andrews ND
Zwach MN
May WA
Bush TX
Myers IN
Latta OH
Ryan NY
Moorhead PA
Rooney PA
Kyros ME
Perkins KY
Bray IN
Ronan IL
St. Germain RI
Brademas IN
Giaimo CT
Gray IL
Tunney CA
Dulski NY
Hanna CA
Zablocki WI
Biester PA
Pollock AK
Mize KS
Williams PA
Minshall OH
Chamberlain MI
Watkins PA
Thomson WI
Edwards AL
Madden IN
Hansen WA
Mink HI
Zion IN
Burke FL
Kirwan OH
Matsunaga HI
Bolling MO
Green OR
Albert OK
Cowger KY
Johnson PA
Denney NE
Kuykendall TN
Brasco NY
O'Neill MA
Daddario CT
Donohue MA
Addabbo NY
Meskill CT
Shriver KS
Carter KY
Derwinski IL
Berry SD
Steiger AZ
Green PA
Udall AZ
Karth MN
Dent PA
Hays OH
Martin NE
Hall MO
Ullman OR
Curtis MO
O'Hara IL
Flood PA
Morris NM
Wyman NH
O'Konski WI
Bow OH
Goodling PA
Betts OH
Scott VA
Cohelan CA
Rostenkowski IL
Kluczynski IL
Patman TX
Mahon TX
Wampler VA
McClure ID
Snyder KY
Hicks WA
Fulton TN
Springer IL
Skubitz KS
Lukens OH
Roudebush IN
Kyl IA
Annunzio IL
Olsen MT
Anderson TN
Randall MO
Gurney FL
Dickinson AL
Rhodes PA
Sisk CA
Pepper FL
Smith IA
Kee WV
Aspinall CO
Slack WV
Dole KS
Gross IA
Sullivan MO
Kelly NY
Wylie OH
Schadeberg WI
Quillen TN
Jonas NC
Irwin CT
Waldie CA
Long MD
Brotzman CO
Hunt NJ
Miller OH
Scherle IA
Feighan OH
Gardner NC
Ashbrook OH
Wright TX
Hamilton IN
Taylor NC
Winn KS
Reid IL
Eilberg PA
Van Deerlin CA
Hungate MO
Lipscomb CA
Clark PA
Vigorito PA
Edmondson OK
Hutchinson MI
Watson SC
Boggs LA
Gibbons FL
Johnson CA
Marsh VA
Hammerschmidt AR
Poff VA
Haley FL
Garmatz MD
Galifianakis NC
Bennett FL
Broyhill NC
Langen MN
Tuck VA
Brooks TX
Young TX
Stubblefield KY
Belcher OK
Staggers WV
Purcell TX
Hardy VA
Rogers FL
Broyhill VA
Colmer MS
Smith OK
Pickle TX
Everett TN
Ashmore SC
Abbitt VA
Rogers CO
Roush IN
Shipley IL
Natcher KY
Watts KY
Baring NV
Satterfield VA
Price TX
Edwards LA
Downing VA
Selden AL
Nichols AL
Abernethy MS
Jones AL
de la Garza TX
Blanton TN
Sikes FL
Hull MO
Whitten MS
Jones NC
Duncan TN
Lennon NC
Fascell FL
Walker NM
Fisher TX
Andrews AL
Cabell TX
Fountain NC
Flynt GA
Hagan GA
Stuckey GA
Whitener NC
Kazen TX
McMillan SC
Passman LA
O'Neal GA
Rivers SC
Ichord MO
Dorn SC
Casey TX
Gettys SC
Steed OK
Mills AR
Brinkley GA
Gathings AR
Montgomery MS
White TX
Roberts TX
Poage TX
Bevill AL
Dowdy TX
Waggonner LA
Jarman OK
Pryor AR
Kornegay NC
Davis GA
Henderson NC
Burleson TX
Fuqua FL


Year: 1969
D–D
D–R
R–R
Degree 1
400
Few
Many
Harvey MI
Stanton OH
Mosher OH
Pike NY
Coughlin PA
Robison NY
Corbett PA
Ford MI
Erlenborn IL
Rhodes AZ
Heckler MA
Schneebeli PA
McClory IL
Findley IL
McEwen NY
Minshall OH
Pettis CA
Mize KS
Rodino NJ
Hamilton IN
Conte MA
Frelinghuysen NJ
Steiger WI
Mayne IA
Grover NY
Hutchinson MI
Andrews ND
Conable NY
Buchanan AL
Minish NJ
Schwengel IA
Smith NY
Byrnes WI
Nelsen MN
Lloyd UT
Talcott CA
Horton NY
Riegle MI
Monagan CT
Gude MD
Biester PA
Widnall NJ
Kleppe ND
Donohue MA
Dellenback OR
Hogan MD
Zwach MN
Arends IL
Whalen OH
Albert OK
Brotzman CO
Reid IL
Zion IN
Latta OH
Betts OH
Kyl IA
Kastenmeier WI
Meeds WA
Obey WI
Ullman OR
Quie MN
Cleveland NH
Broyhill VA
Wylie OH
Waldie CA
Holifield CA
Burke MA
McDade PA
Springer IL
Broyhill NC
Langen MN
Ryan NY
Yatron PA
Helstoski NJ
Anderson CA
Hicks WA
Mahon TX
Duncan TN
Jarman OK
Davis WI
Hunt NJ
Ruth NC
Udall AZ
Patten NJ
Williams PA
Collins TX
Nix PA
Perkins KY
Hansen ID
Shriver KS
Poff VA
Johnson CA
Madden IN
Price IL
Tiernan RI
Galifianakis NC
Rogers FL
Hammerschmidt AR
Eshleman PA
Smith CA
Goodling PA
Martin NE
Zablocki WI
Keith MA
Hanley NY
O'Neill MA
Friedel MD
Downing VA
Chamberlain MI
Fuqua FL
Reuss WI
Matsunaga HI
Hathaway ME
Fulton PA
Johnson PA
Mizell NC
Belcher OK
Kyros ME
Mink HI
Annunzio IL
Wyman NH
Scott VA
Vanik OH
Morgan PA
Watts KY
Roth DE
O'Hara MI
Gonzalez TX
Daniels NJ
Flood PA
Thomson WI
Miller OH
Harsha OH
Waggonner LA
Haley FL
Boland MA
Murphy IL
Foley WA
Eilberg PA
Dulski NY
Slack WV
Gubser CA
Marsh VA
Abernethy MS
Vigorito PA
Garmatz MD
Steed OK
Taylor NC
Brinkley GA
Fountain NC
Skubitz KS
Henderson NC
Rooney PA
Wampler VA
McFall CA
Adams WA
Olsen MT
Kazen TX
Griffin MS
Philbin MA
Brown OH
Carter KY
Daniel VA
Byrne PA
Gaydos PA
Pirnie NY
Beall MD
Smith IA
Pickle TX
Clausen CA
Feighan OH
Staggers WV
Sandman NJ
Casey TX
Gibbons FL
Boggs LA
Roberts TX
Natcher KY
Long MD
Stubblefield KY
Ichord MO
Jones NC
Pucinski IL
Sikes FL
Sisk CA
Pryor AR
Preyer NC
Burlison MO
Blanton TN
Randall MO
Bevill AL


Year: 1971
D–D
D–R
R–R
Degree 1
400
Few
Many
Steele CT
Frenzel MN
Randall MO
Smith NY
Conte MA
Monagan CT
Widnall NJ
Mailliard CA
Horton NY
Coughlin PA
Lent NY
McKevitt CO
O'Konski WI
Hillis IN
Stanton OH
Robison NY
Hansen ID
Cotter CT
Rostenkowski IL
Gibbons FL
Vigorito PA
Heckler MA
Garmatz MD
Zwach MN
Dellenback OR
Wyatt OR
Vander Jagt MI
Flowers AL
Lloyd UT
Hosmer CA
Ford MI
Moorhead PA
Annunzio IL
McKay UT
Shipley IL
de la Garza TX
Boggs LA
Murphy IL
Sullivan MO
Perkins KY
Flood PA
Forsythe NJ
Railsback IL
Wydler NY
Mayne IA
Hastings NY
Veysey CA
Skubitz KS
Byrnes WI
Roncalio WY
Danielson CA
Daniels NJ
Biaggi NY
Giaimo CT
Ruppe MI
Brown MI
Findley IL
Gubser CA
Minshall OH
Whalley PA
McEwen NY
Culver IA
Rodino NJ
Symington MO
Donohue MA
Yatron PA
Rooney PA
Keating OH
Teague CA
Mathias CA
Carey NY
Aspin WI
Corman CA
Ashley OH
Barrett PA
Grasso CT
Gaydos PA
Nedzi MI
Minish NJ
Hamilton IN
Biester PA
Patten NJ
Young TX
Peyser NY
Taylor NC
Jones NC
Arends IL
Pirnie NY
Harsha OH
Collier IL
Carney OH
Reid NY
Yates IL
Drinan MA
Tiernan RI
Riegle MI
Adams WA
Obey WI
Pucinski IL
Pepper FL
Hays OH
McCloskey CA
Zablocki WI
Aspinall CO
Buchanan AL
Broomfield MI
Hammerschmidt AR
Whitehurst VA
Poff VA
Bow OH
Jarman OK
Podell NY
Edwards CA
Green PA
Gude MD
Griffiths MI
Bergland MN
Mollohan WV
Green OR
Wilson CA
Ware PA
Sandman NJ
Schneebeli PA
Mills MD
Goodling PA
Mitchell MD
Dow NY
Bingham NY
Koch NY
Hechler WV
Jacobs IN
Begich AK
Price IL
Quie MN
Mahon TX
Shriver KS
Chamberlain MI
Downing VA
Springer IL
Davis WI
Belcher OK
Dickinson AL
Kastenmeier WI
Mink HI
Rosenthal NY
Collins IL
Karth MN
Rangel NY
Matsunaga HI
Burke MA
Johnson CA
du Pont DE
Hogan MD
Thomson WI
Johnson PA
Bevill AL
Waggonner LA
Edwards AL
Wylie OH
Michel IL
Abzug NY
Hathaway ME
Brademas IN
Boland MA
Hicks MA
Morgan PA
McFall CA
Natcher KY
Thone NE
Fuqua FL
McCollister NE
Daniel VA
Bray IN
Archer TX
Clancy OH
Price TX
Spence SC
Madden IN
Ford MI
Eckhardt TX
Dellums CA
Burton CA
Vanik OH
McCormack WA
Badillo NY
Scheuer NY
Stokes OH
Robinson VA
Quillen TN
Jonas NC
Mikva IL
Rees CA
Harrington MA
Helstoski NJ
Reuss WI
Sarbanes MD
O'Hara MI
Fulton TN
O'Neill MA
Fascell FL
Kazen TX
Brotzman CO
Williams PA
Henderson NC
Kemp NY
Shoup MT
King NY
Young FL
Waldie CA
Leggett CA
Seiberling OH
Ryan NY
Nix PA
Thompson NJ
Eilberg PA
Anderson CA
Whalen OH
Kluczynski IL
Hanley NY
Gonzalez TX
Preyer NC
White TX
Brinkley GA
Myers IN
Erlenborn IL
Latta OH
Fisher TX
Betts OH
Sebelius KS
Scott VA
Roybal CA
Steiger AZ
Rhodes AZ
Abourezk SD
Howard NJ
Roush IN
Winn KS
Zion IN
Burke FL
Scherle IA
Collins TX
Wolff NY
St. Germain RI
Melcher MT
Rogers FL
Byron MD
Duncan TN
Frelinghuysen NJ
Ruth NC
Dingell MI
Byrne PA
Wright TX
McKinney CT
Keith MA
Miller OH
Wyman NH
Burleson TX
Smith CA
Devine OH
Fraser MN
Udall AZ
Kyros ME
Meeds WA
Dulski NY
Smith IA
Brooks TX
Stubblefield KY
Clawson CA
Camp OK
Brasco NY
Link ND
Deerlin CA
Moss CA
Hicks WA
McDade PA
Andrews ND
Casey TX
Fountain NC
Broyhill NC
Wampler VA
Kyl IA
Mizell NC
Thompson GA
Terry NY
Powell OH
Haley FL
Talcott CA
Colmer MS
Addabbo NY
Evans CO
Stanton OH
Foley WA
Hungate MO
Long MD
Gray IL
Mazzoli KY
Burlison MO
Harvey MI
McClory IL
Brown OH
Stephens GA
Passman LA
Frey FL
Nichols AL
Lennon NC
Baker TN
Hutchinson MI
Montgomery MS
Denholm SD
Mosher OH
Roe NJ
Schwengel IA
Steiger WI
Hunt NJ
Snyder KY
Chappell FL
Bolling MO
Holifield CA
Stratton NY
Anderson IL
Cederberg MI
Nelsen MN
Broyhill VA
Abbitt VA
Satterfield VA
Roy KS
Sisk CA
Staggers WV
Bennett FL
Jones AL
Conable NY
Griffin MS
Mann SC
Ullman OR
Cabell TX
Whitten MS
Grover NY
Pickle TX
Delaney NY
Cleveland NH
Gettys SC
Roberts TX
Hull MO
Dorn SC
Ichord MO
Pike NY
Carter KY
Mathis GA
Slack WV
Steed OK
Pettis CA
Sikes FL
Clausen CA



Year: 1973
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D–R
R–R
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Few
Many
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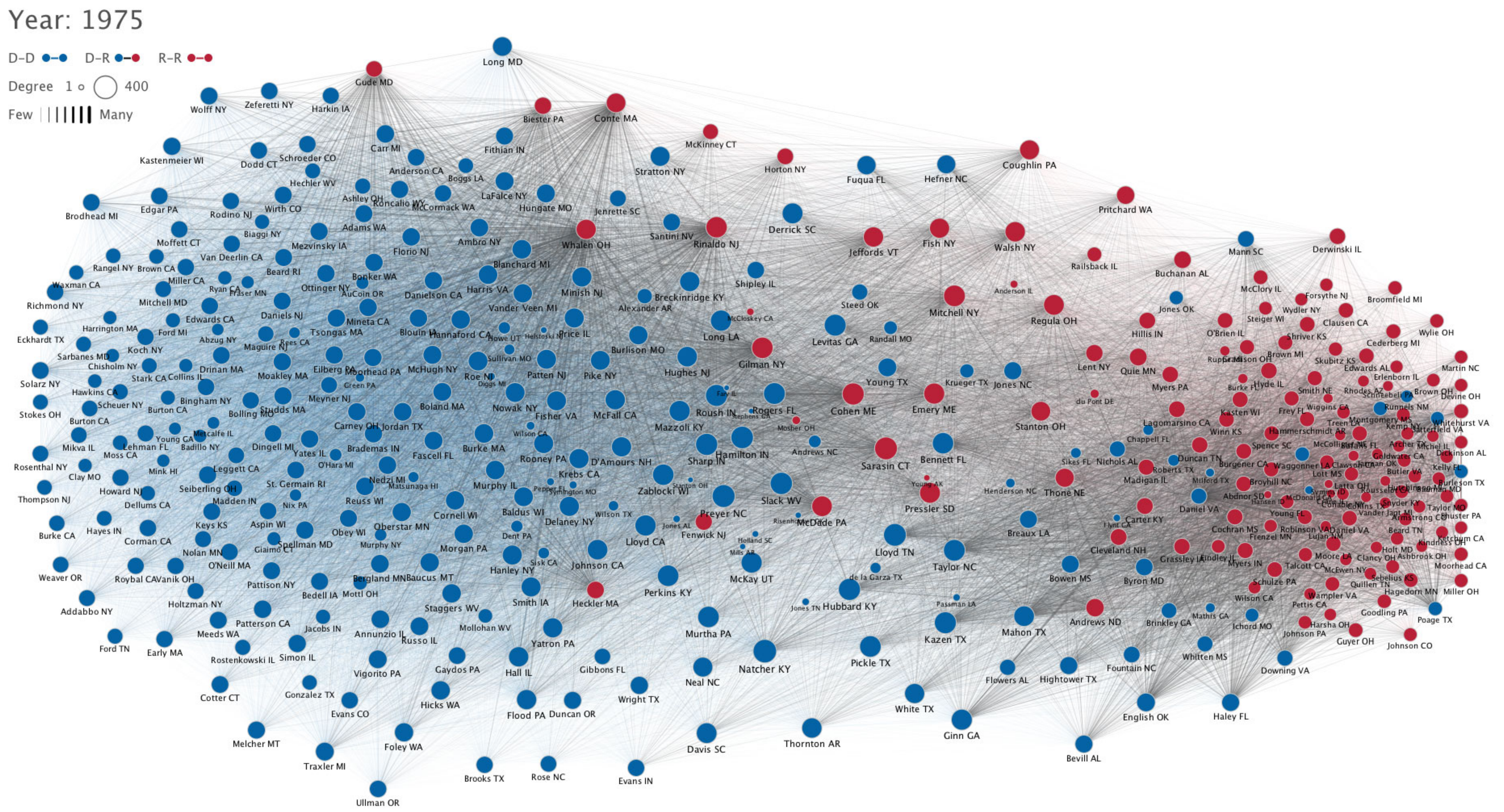
Randall MO
Davis SC
Lent NY
Hillis IN
Roberts TX
Whitten MS
Heckler MA
Wright TX
Stratton NY
Cronin MA
Steed OK
Flowers AL
Jones OK
Ginn GA
Bowen MS
Chappell FL
Downing VA
Waggonner LA
Litton MO
McKinney CT
St. Germain RI
Mezvinsky IA
Gude MD
Mosher OH
Frenzel MN
Kazen TX
White TX
Taylor NC
Cleveland NH
Buchanan AL
O'Brien IL
Towell NV
Derwinski IL
Hunt NJ
Burke MA
McCloskey CA
Mollohan WV
Fulton TN
Hechler WV
O'Hara MI
Gaydos PA
Mallary VT
Wydler NY
Grover NY
Mayne IA
Conable NY
Burleson TX
Thornton AR
Roy KS
Eilberg PA
Nedzi MI
Schroeder CO
Daniels NJ
Donohue MA
Staggers WV
Steele CT
Zablocki WI
Rogers FL
Clausen CA
Harsha OH
Wylie OH
Hanrahan IL
Beard TN
Davis WI
Clancy OH
Daniel VA
Bingham NY
Whalen OH
Gonzalez TX
Annunzio IL
Flood PA
Slack WV
Bennett FL
Fountain NC
Winn KS
Haley FL
Mizell NC
Baker TN
Stark CA
Kastenmeier WI
Corman CA
Madden IN
Sarbanes MD
Jordan TX
Hicks WA
Jones AL
Casey TX
Byron MD
Whitehurst VA
Kemp NY
Dickinson AL
Ketchum CA
Rangel NY
Seiberling OH
Hanley NY
Young TX
Henderson NC
Martin NC
Ford MI
Green PA
Owens UT
Helstoski NJ
Perkins KY
Williams PA
Wampler VA
Frey FL
Sebelius KS
Hutchinson MI
Eckhardt TX
Mitchell MD
Bergland MN
Long LA
Natcher KY
Brotzman CO
Guyer OH
Miller OH
Devine OH
Archer TX
Abzug NY
Mink HI
Barrett PA
Fascell FL
Rodino NJ
Holt MD
Spence SC
Daniel VA
Burton CA
Boland MA
Minish NJ
Stanton OH
Mitchell NY
Mahon TX
Shriver KS
Abdnor SD
Ruth NC
Shuster PA
Holtzman NY
Koch NY
Dingell MI
Studds MA
Patten NJ
Pike NY
Hamilton IN
Sarasin CT
Bray IN
Lujan NM
Parris VA
Broyhill VA
Goodling PA
Dellums CA
Rosenthal NY
Brademas IN
Yates IL
Karth MN
Matsunaga HI
Satterfield VA
Anderson CA
Edwards CA
Roe NJ
Vigorito PA
Preyer NC
Andrews ND
Brinkley GA
Thomson WI
Pettis CA
Broyhill NC
Butler VA
Duncan TN
Latta OH
Cochran MS
Dennis IN
Zion IN
Metcalfe IL
Brown CA
Carney OH
Wolff NY
Michel IL
Moorhead CA
Fraser MN
Nix PA
Vanik OH
Roush IN
Thone NE
Hosmer CA
Armstrong CO
Bafalis FL
Kyros ME
Moorhead PA
Hungate MO
Yatron PA
Cederberg MI
Nichols AL
Arends IL
Harrington MA
Adams WA
Drinan MA
Rees CA
Gilman NY
Veysey CA
Hinshaw CA
Obey WI
McCormack WA
Breaux LA
Robinson VA
Roybal CA
Thompson NJ
Addabbo NY
Kluczynski IL
Rinaldo NJ
Regula OH
Young IL
McCollister NE
Edwards AL
Hammerschmidt AR
Lehman FL
Meeds WA
Breckinridge KY
Jones NC
Madigan IL
Hogan MD
Chamberlain MI
Myers IN
Schneebeli PA
Danielson CA
Van Deerlin CA
Udall AZ
Burke FL
Reuss WI
Murphy IL
Rooney PA
Johnson CA
Horton NY
Forsythe NJ
Bevill AL
Broomfield MI
Johnson PA
Eshleman PA
Burgener CA
Moss CA
Wilson CA
Young GA
Symington MO
Pepper FL
Mazzoli KY
McFall CA
Burlison MO
Quie MN
McClory IL
Mann SC
Hastings NY
Brown MI
Nelsen MN
Froehlich WI
Tiernan RI
Howard NJ
Foley WA
Delaney NY
Ruppe MI
Skubitz KS
Shoup MT
Leggett CA
Collins IL
Grasso CT
Culver IA
Roncalio WY
Brooks TX
Peyser NY
McDade PA
du Pont DE
Mathias CA
Brown OH
Sikes FL
O'Neill MA
Clark PA
Long MD
Cotter CT
Dent PA
Shipley IL
Robison NY
Steiger WI
Evans CO
Melcher MT
Smith IA
Wilson TX
Rose NC
Coughlin PA
Gettys SC
Erlenborn IL
Talcott CA
Sullivan MO
Railsback IL
Widnall NJ
Steelman TX
Vander Jagt MI
Giaimo CT
Dulski NY
Biester PA
Heinz PA
Andrews NC
Smith NY
Ashley OH
Morgan PA
Stanton OH
Conte MA
Findley IL
Sisk CA
Boggs LA
Pickle TX
Walsh NY
Carter KY
Rostenkowski IL
Denholm SD
Cohen ME
Fuqua FL
Gibbons FL
McKay UT
Dellenback OR
Ullman OR
Esch MI
Fish NY



Year: 1975
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D–R
R–R
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400
Few
Many
Long MD
Gude MD
Wolff NY
Zeferetti NY
Harkin IA
Biester PA
Conte MA
McKinney CT
Carr MI
Fithian IN
Kastenmeier WI
Dodd CT
Schroeder CO
Anderson CA
Boggs LA
Stratton NY
Horton NY
Fuqua FL
Hefner NC
Coughlin PA
Hechler WV
Ashley OH
LaFalce NY
Brodhead MI
Edgar PA
Rodino NJ
Wirth CO
Roncalio WY
McCormack WA
Hungate MO
Jenrette SC
Pritchard WA
Biaggi NY
Adams WA
Santini NV
Derrick SC
Moffett CT
Mezvinsky IA
Florio NJ
Ambro NY
Whalen OH
Rinaldo NJ
Jeffords VT
Fish NY
Walsh NY
Mann SC
Derwinski IL
Van Deerlin CA
Blanchard MI
Railsback IL
Buchanan AL
Rangel NY
Brown CA
Beard RI
Shipley IL
Miller CA
Bonker WA
McClory IL
Waxman CA
Ryan CA
Fraser MN
Ottinger NY
AuCoin OR
Danielson CA
Harris VA
Minish NJ
Breckinridge KY
Anderson IL
Forsythe NJ
Broomfield MI
Richmond NY
Mitchell MD
Vander Veen MI
Alexander AR
Steed OK
Mitchell NY
Regula OH
Jones OK
Wydler NY
Edwards CA
Daniels NJ
Mineta CA
McCloskey CA
Steiger WI
Clausen CA
Harrington MA
Eckhardt TX
Ford MI
Abzug NY
Tsongas MA
Blouin IA
Hannaford CA
Howe UT
Helstoski NJ
Price IL
Long LA
Levitas GA
Randall MO
Hillis IN
O'Brien IL
Shriver KS
Wylie OH
Sarbanes MD
Koch NY
Maguire NJ
Rees CA
Burlison MO
Gilman NY
Cederberg MI
Chisholm NY
Drinan MA
Eilberg PA
Sullivan MO
Lent NY
Brown MI
Skubitz KS
Solarz NY
Stark CA
Collins IL
Moakley MA
Moorhead PA
McHugh NY
Roe NJ
Patten NJ
Pike NY
Hughes NJ
Young TX
Krueger TX
Jones NC
Quie MN
Edwards AL
Martin NC
Hawkins CA
Green PA
Diggs MI
Myers PA
Erlenborn IL
Bingham NY
Meyner NJ
Boland MA
Nowak NY
Fisher VA
McFall CA
Roush IN
Rogers FL
Cohen ME
Emery ME
du Pont DE
Hyde IL
Burke FL
Smith NE
Rhodes AZ
Brown OH
Devine OH
Stokes OH
Scheuer NY
Burton CA
Bolling MO
Studds MA
Mosher OH
Stanton OH
Kasten WI
Frey FL
Wiggins CA
Runnels NM
Burton CA
Carney OH
Jordan TX
Mazzoli KY
Lagomarsino CA
Montgomery MS
Kemp NY
Whitehurst VA
Young GA
Metcalfe IL
Winn KS
Hammerschmidt AR
Mikva IL
Lehman FL
Badillo NY
Dingell MI
Chappell FL
Satterfield VA
Yates IL
Brademas IN
Fascell FL
Burke MA
Hamilton IN
Andrews NC
Bennett FL
Spence SC
Archer TX
Moss CA
Sharp IN
Rosenthal NY
Mink HI
Leggett CA
O'Hara MI
Rooney PA
D'Amours NH
Sarasin CT
Sikes FL
Nichols AL
Duncan TN
Burgener CA
Waggonner LA
Goldwater CA
Dickinson AL
Clay MO
Nedzi MI
Krebs CA
Roberts TX
Butler VA
Kelly FL
Seiberling OH
St. Germain RI
Matsunaga HI
Murphy IL
Zablocki WI
Stanton OH
Young AK
Madigan IL
Milford TX
Broyhill NC
Burleson TX
Howard NJ
Pepper FL
Symington MO
Slack WV
Henderson NC
Thone NE
Abdnor SD
Thompson NJ
Dellums CA
Madden IN
Reuss WI
Preyer NC
Pressler SD
Snyder KY
Nix PA
Cornell WI
Baldus WI
Wilson TX
Young FL
Taylor MO
Keys KS
Aspin WI
Delaney NY
McDade PA
Daniel VA
Armstrong CO
Shuster PA
Burke CA
Hayes IN
Obey WI
Oberstar MN
Dent PA
Jones AL
Fenwick NJ
Carter KY
Flynt GA
Cochran MS
Robinson VA
Daniel VA
Beard TN
Corman CA
Spellman MD
Murphy NY
Lloyd CA
Holland SC
Breaux LA
Frenzel MN
Lujan NM
Ketchum CA
Nolan MN
Giaimo CT
Morgan PA
Mills AR
Lloyd TN
Cleveland NH
Holt MD
Weaver OR
Roybal CA
Vanik OH
O'Neill MA
Hanley NY
Sisk CA
Johnson CA
Taylor NC
Grassley IA
Findley IL
Moore LA
Clancy OH
Ashbrook OH
Pattison NY
Bergland MN
Baucus MT
de la Garza TX
Myers IN
Talcott CA
McEwen NY
Moorhead CA
Bedell IA
Mottl OH
Smith IA
Heckler MA
Perkins KY
McKay UT
Bowen MS
Byron MD
Schulze PA
Quillen TN
Sebelius KS
Addabbo NY
Holtzman NY
Staggers WV
Passman LA
Wilson CA
Hagedorn MN
Miller OH
Jones TN
Hubbard KY
Wampler VA
Pettis CA
Goodling PA
Patterson CA
Jacobs IN
Mollohan WV
Mathis GA
Meeds WA
Annunzio IL
Andrews ND
Brinkley CA
Ichord MO
Poage TX
Ford TN
Early MA
Russo IL
Yatron PA
Murtha PA
Kazen TX
Mahon TX
Harsha OH
Johnson PA
Guyer OH
Johnson CO
Rostenkowski IL
Simon IL
Hall IL
Pickle TX
Vigorito PA
Gaydos PA
Gibbons FL
Neal NC
Natcher KY
Fountain NC
Whitten MS
Downing VA
Flowers AL
Hightower TX
Cotter CT
Gonzalez TX
Hicks WA
Evans CO
Flood PA
Duncan OR
Wright TX
White TX
English OK
Haley FL
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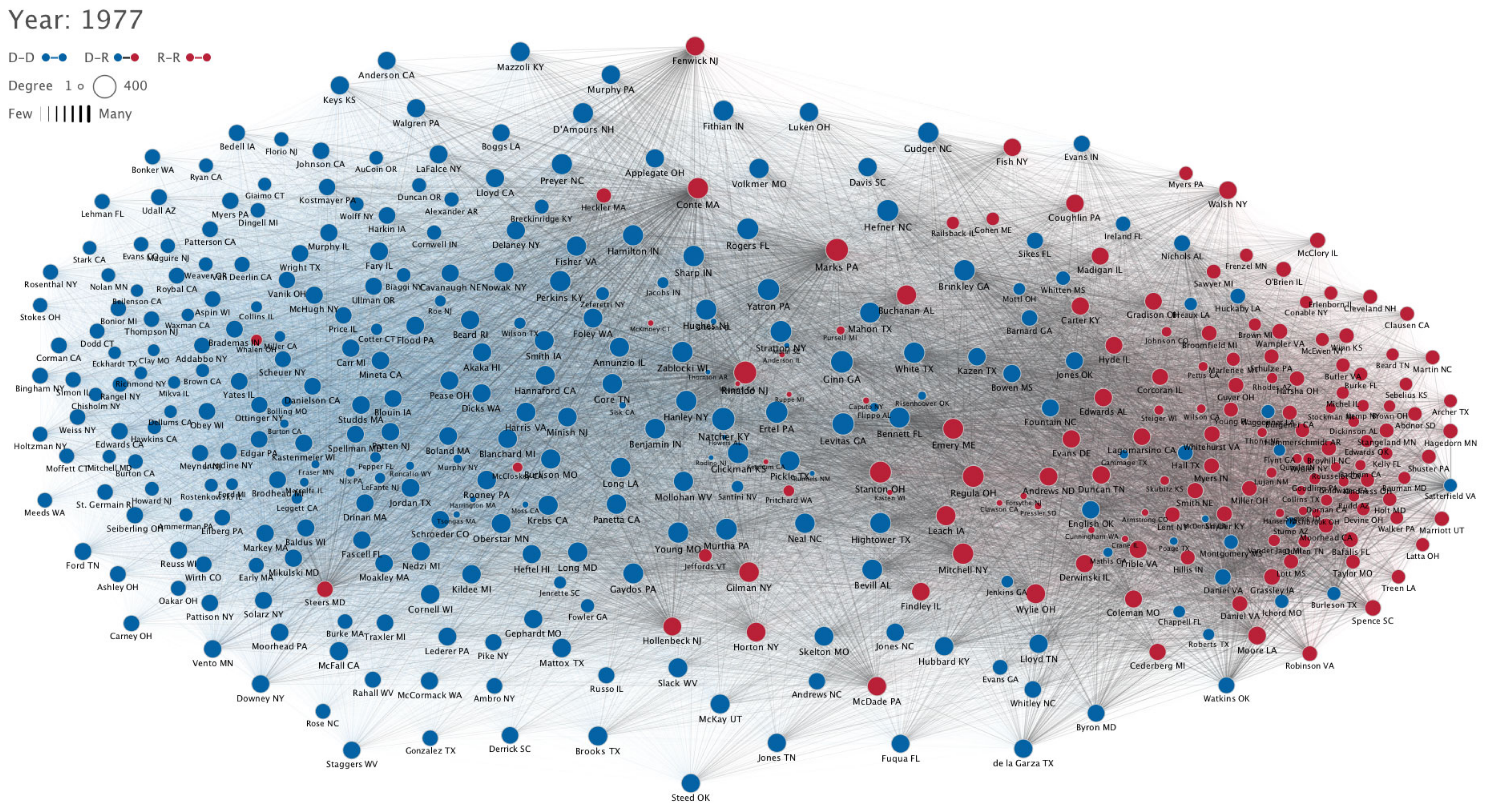
Melcher MT
Foley WA
Davis SC
Thornton AR
Bevill AL
Traxler MI
Brooks TX
Rose NC
Evans IN
Ullman OR


Year: 1977
D–D
D–R
R–R
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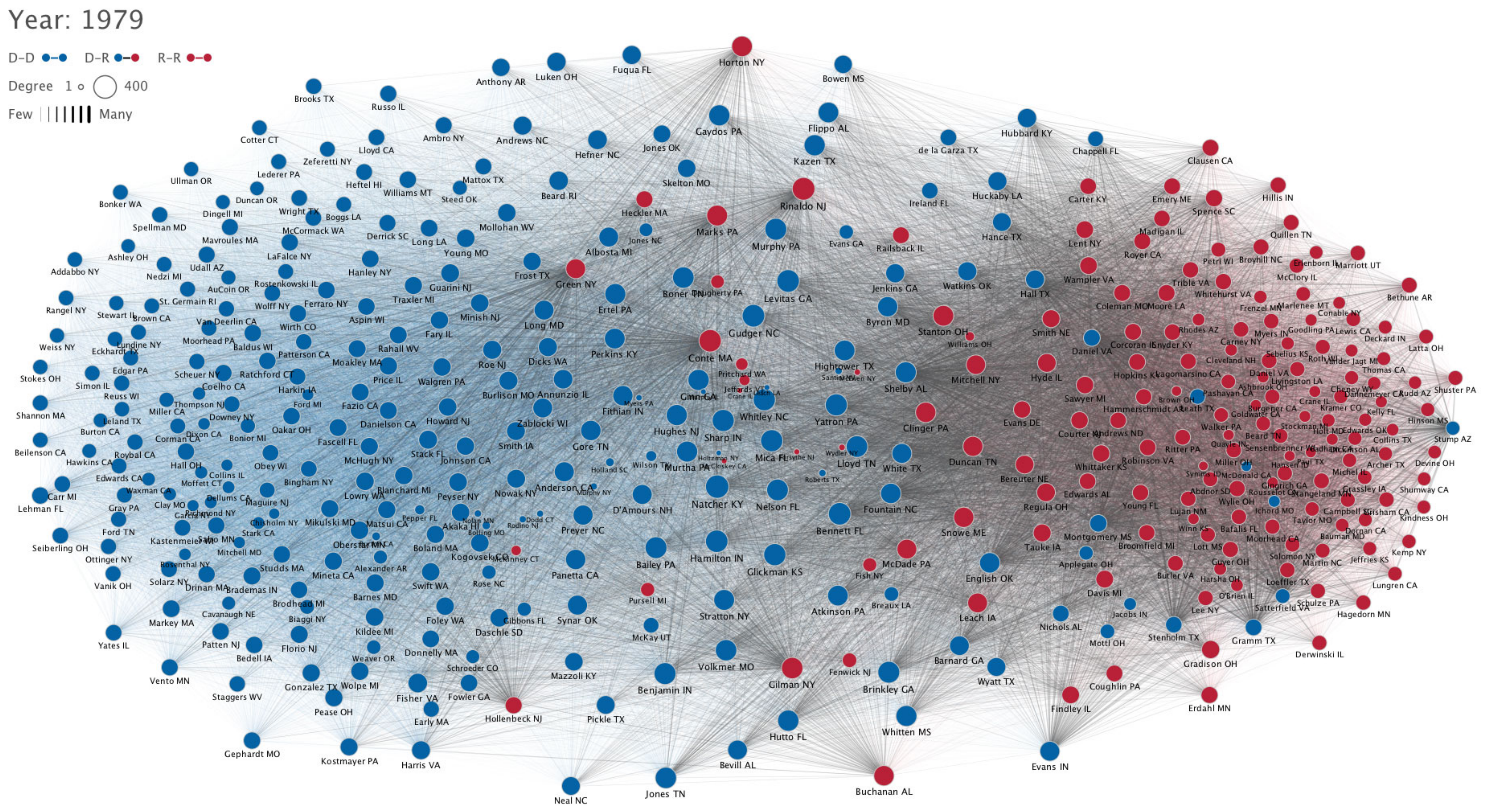
400
Few
Many



Year: 1979
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D–R
R–R
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Fuqua FL
Luken OH
Anthony AR
Bowen MS
Brooks TX
Russo IL
Gaydos PA
Flippo AL
Hubbard KY
Cotter CT
Lloyd CA
Ambro NY
Andrews NC
Hefner NC
Jones OK
Kazen TX
de la Garza TX
Chappell FL
Clausen CA
Ullman OR
Lederer PA
Zeferetti NY
Heftel HI
Williams MT
Steed OK
Mattox TX
Beard RI
Skelton MO
Rinaldo NJ
Ireland FL
Huckaby LA
Carter KY
Emery ME
Spence SC
Hillis IN
Bonker WA
Dingell MI
Duncan OR
Wright TX
Boggs LA
Heckler MA
Marks PA
Murphy PA
Evans GA
Railsback IL
Hance TX
Lent NY
Madigan IL
Quillen TN
Spellman MD
Mavroules MA
McCormack WA
Derrick SC
Long LA
Young MO
Mollohan WV
Albosta MI
Jones NC
Royer CA
Petri WI
Broyhill NC
Erlenborn IL
Marriott UT
Ashley OH
Udall AZ
LaFalce NY
Hanley NY
Frost TX
Green NY
Jenkins GA
Watkins OK
Hall TX
Wampler VA
McClory IL
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Nedzi MI
AuCoin OR
Rostenkowski IL
Guarini NJ
Traxler MI
Levitas GA
Trible VA
Whitehurst VA
Bethune AR
Rangel NY
Stewart IL
St. Germain RI
Brown CA
Wolff NY
Ferraro NY
Minish NJ
Ertel PA
Byron MD
Stanton OH
Coleman MO
Moore LA
Frenzel MN
Marlenee MT
Conable NY
Van Deerlin CA
Wirth CO
Aspin WI
Long MD
Gudger NC
Smith NE
Williams OH
Rhodes AZ
Myers IN
Goodling PA
Lewis CA
Weiss NY
Eckhardt TX
Lundine NY
Moorhead PA
Baldus WI
Fary IL
Perkins KY
Conte MA
Daniel VA
Corcoran IL
Snyder KY
Carney NY
Deckard IN
Latta OH
Patterson CA
Rahall WV
Dicks WA
Hightower TX
Sebelius KS
Stokes OH
Edgar PA
Scheuer NY
Ratchford CT
Moakley MA
Roe NJ
Pritchard WA
Cleveland NH
Roth WI
Vander Jagt MI
Simon IL
Coelho CA
Harkin IA
Price IL
Walgren PA
Shelby AL
Mitchell NY
Hyde IL
Hopkins KY
Lagomarsino CA
Daniel VA
Livingston LA
Thomas CA
Reuss WI
Thompson NJ
Ford MI
Fazio CA
Burlison MO
Annunzio IL
Jeffords VT
Sawyer MI
Brown OH
Pashayan CA
Ashbrook OH
Cheney WY
Dannemeyer CA
Rudd AZ
Shuster PA
Shannon MA
Miller CA
Downey NY
Fithian IN
Whitley NC
Clinger PA
Evans DE
Hammerschmidt AR
Leath TX
Goldwater CA
Crane IL
Kramer CO
Kelly FL
Leland TX
Oakar OH
Danielson CA
Howard NJ
Zablocki WI
Hughes NJ
Yatron PA
Courter NJ
Andrews ND
Walker PA
Holt MD
Edwards OK
Hinson MS
Stump AZ
Burton CA
Dixon CA
Bonior MI
Corman CA
Smith IA
Gore TN
Sharp IN
Beard TN
Stockman MI
Beilenson CA
Roybal CA
Fascell FL
Stack FL
Johnson CA
Mica FL
Lloyd TN
White TX
Duncan TN
Ritter PA
Quayle IN
Sensenbrenner WI
Collins TX
Hawkins CA
Hall OH
Obey WI
McHugh NY
Wilson TX
Holland SC
Murtha PA
Roberts TX
Robinson VA
Miller OH
Archer TX
Devine OH
Edwards CA
Moffett CT
Collins IL
Bingham NY
Blanchard MI
Peyser NY
Anderson CA
Bereuter NE
Whittaker KS
Carr MI
Waxman CA
Dellums CA
Lowry WA
Nowak NY
Murphy NY
Natcher KY
Nelson FL
Fountain NC
Edwards AL
Young FL
Michel IL
Grassley IA
Shumway CA
Lehman FL
Gray PA
Clay MO
Garcia NY
Richmond NY
Maguire NJ
D'Amours NH
Regula OH
Abdnor SD
Rousselot CA
Stangeland MN
Wylie OH
Lujan NM
Campbell SC
Grisham CA
Kindness OH
Ford TN
Chisholm NY
Stark CA
Mikulski MD
Matsui CA
Pepper FL
Akaka HI
Rodino NJ
Dodd CT
Bolling MO
Preyer NC
Bennett FL
Snowe ME
Montgomery MS
Tauke IA
Taylor MO
Dornan CA
Bafalis FL
Winn KS
Seiberling OH
Kastenmeier WI
Sabo MN
Oberstar MN
Boland MA
Kogovsek CO
McKinney CT
Broomfield MI
Moorhead CA
Bauman MD
Ottinger NY
Mitchell MD
Rosenthal NY
Studds MA
Mineta CA
Alexander AR
Panetta CA
Bailey PA
Hamilton IN
Glickman KS
McDade PA
Fish NY
English OK
Applegate OH
Lott MS
Guyer OH
Solomon NY
Jeffries KS
Kemp NY
Vanik OH
Solarz NY
Drinan MA
Brademas IN
Swift WA
Rose NC
Butler VA
Harsha OH
Martin NC
Loeffler TX
Lungren CA
Markey MA
Cavanaugh NE
Brodhead MI
Biaggi NY
Barnes MD
Pursell MI
Breaux LA
Atkinson PA
Davis MI
O'Brien IL
Schulze PA
Lee NY
Satterfield VA
Hagedorn MN
Yates IL
Patten NJ
Florio NJ
Kildee MI
Foley WA
Gibbons FL
Daschle SD
Synar OK
Stratton NY
Leach IA
Nichols AL
Jacobs IN
Mottl OH
Stenholm TX
Gramm TX
Bedell IA
Weaver OR
Donnelly MA
McKay UT
Vento MN
Schroeder CO
Mazzoli KY
Volkmer MO
Fenwick NJ
Barnard GA
Gradison OH
Derwinski IL
Staggers WV
Gonzalez TX
Wolpe MI
Fisher VA
Fowler GA
Benjamin IN
Gilman NY
Brinkley GA
Wyatt TX
Coughlin PA
Pease OH
Early MA
Hollenbeck NJ
Pickle TX
Findley IL
Erdahl MN
Hutto FL
Whitten MS
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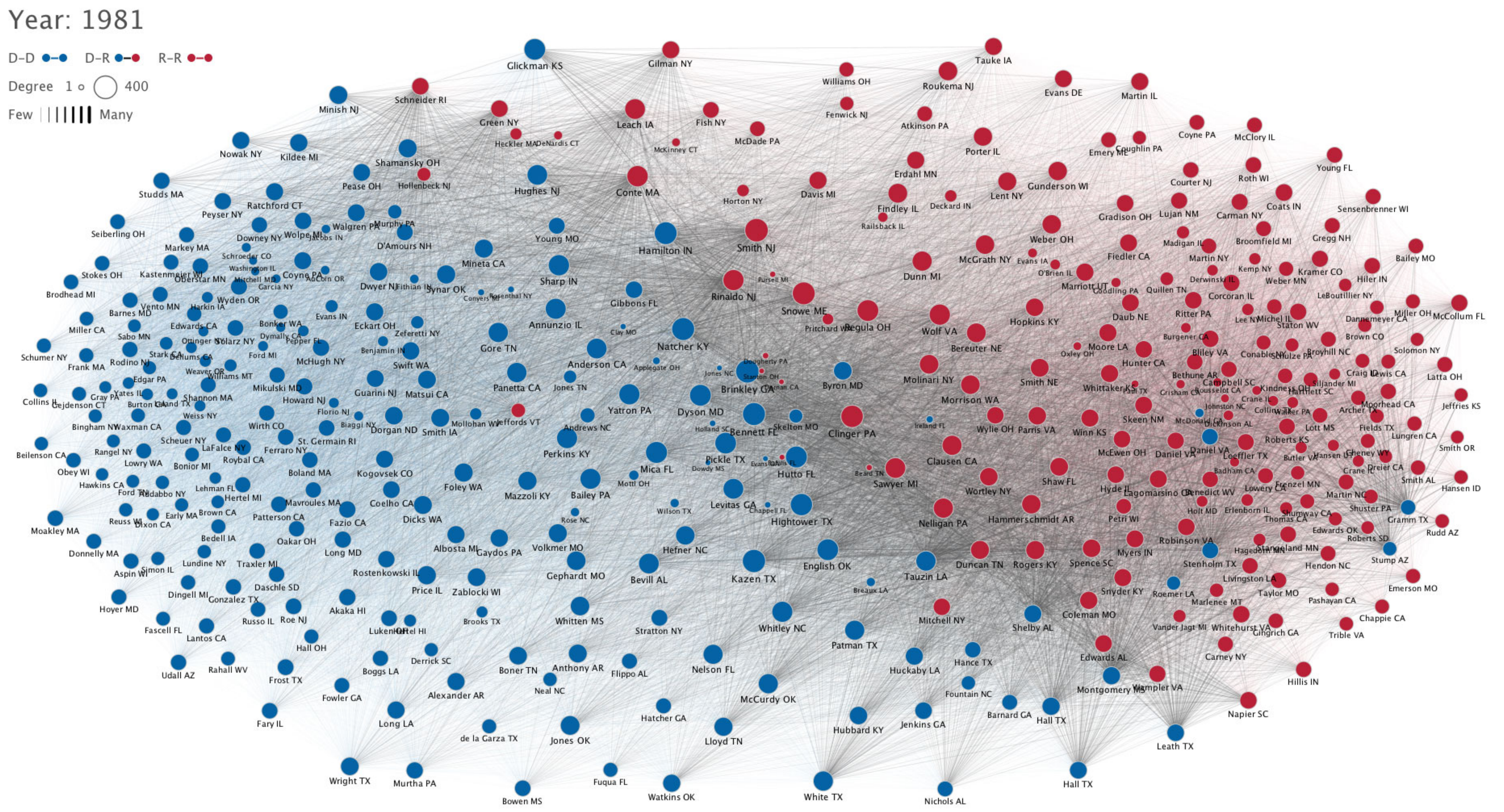
Kostmayer PA
Harris VA
Bevill AL
Evans IN
Neal NC
Jones TN
Buchanan AL


Year: 1981
D-D
D-R
R-R
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Few Many
Glickman KS
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Roukema NJ
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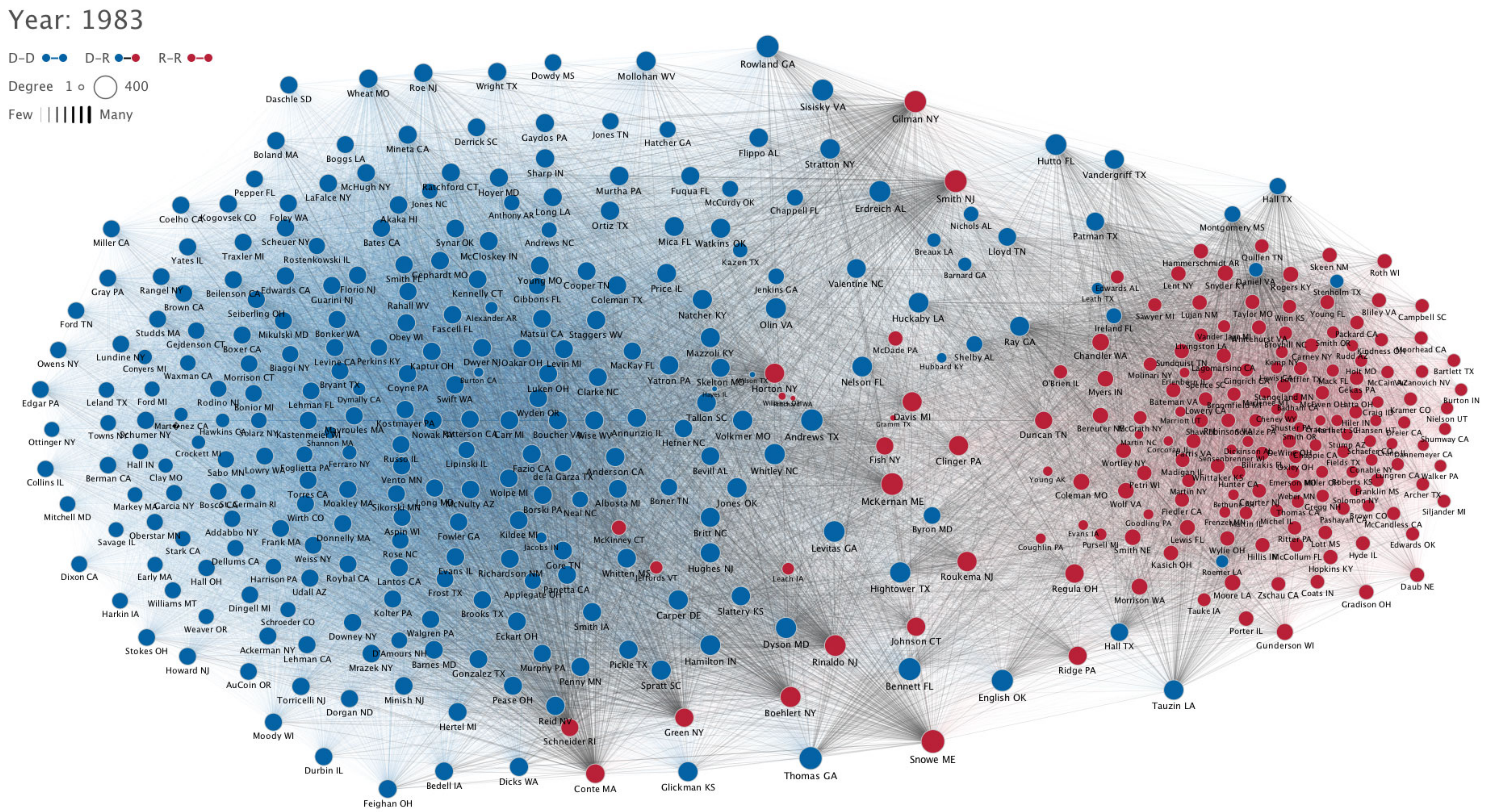
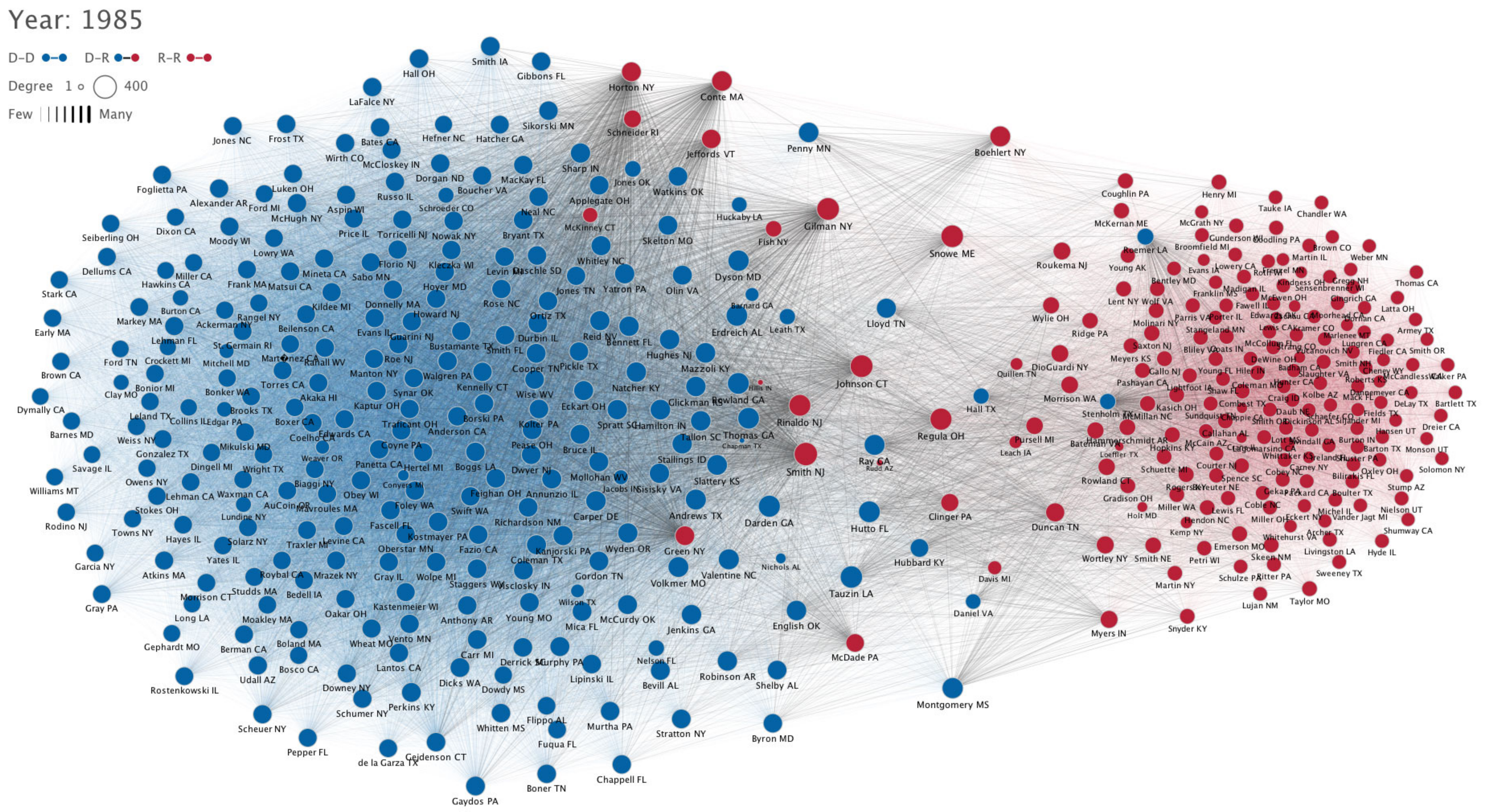
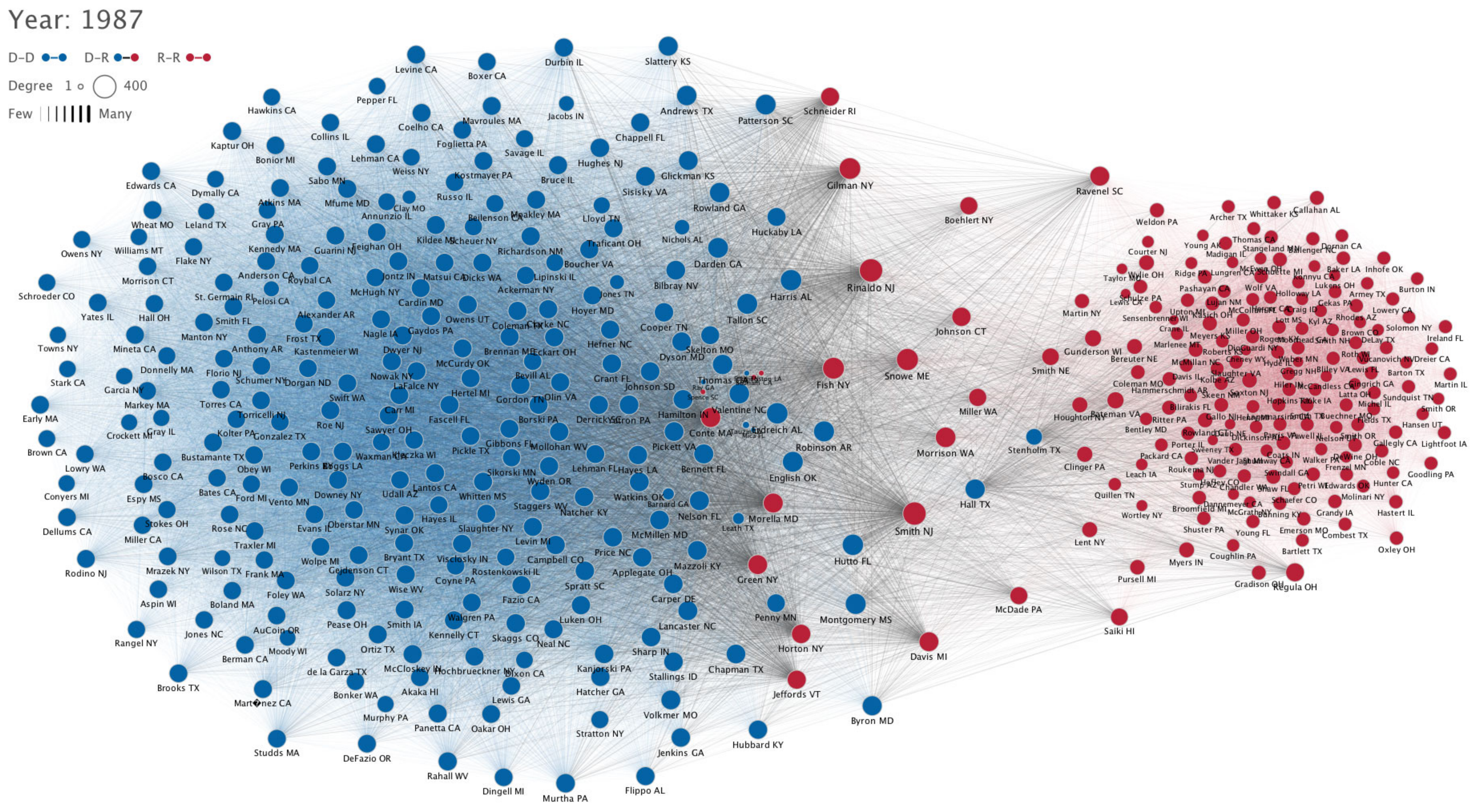
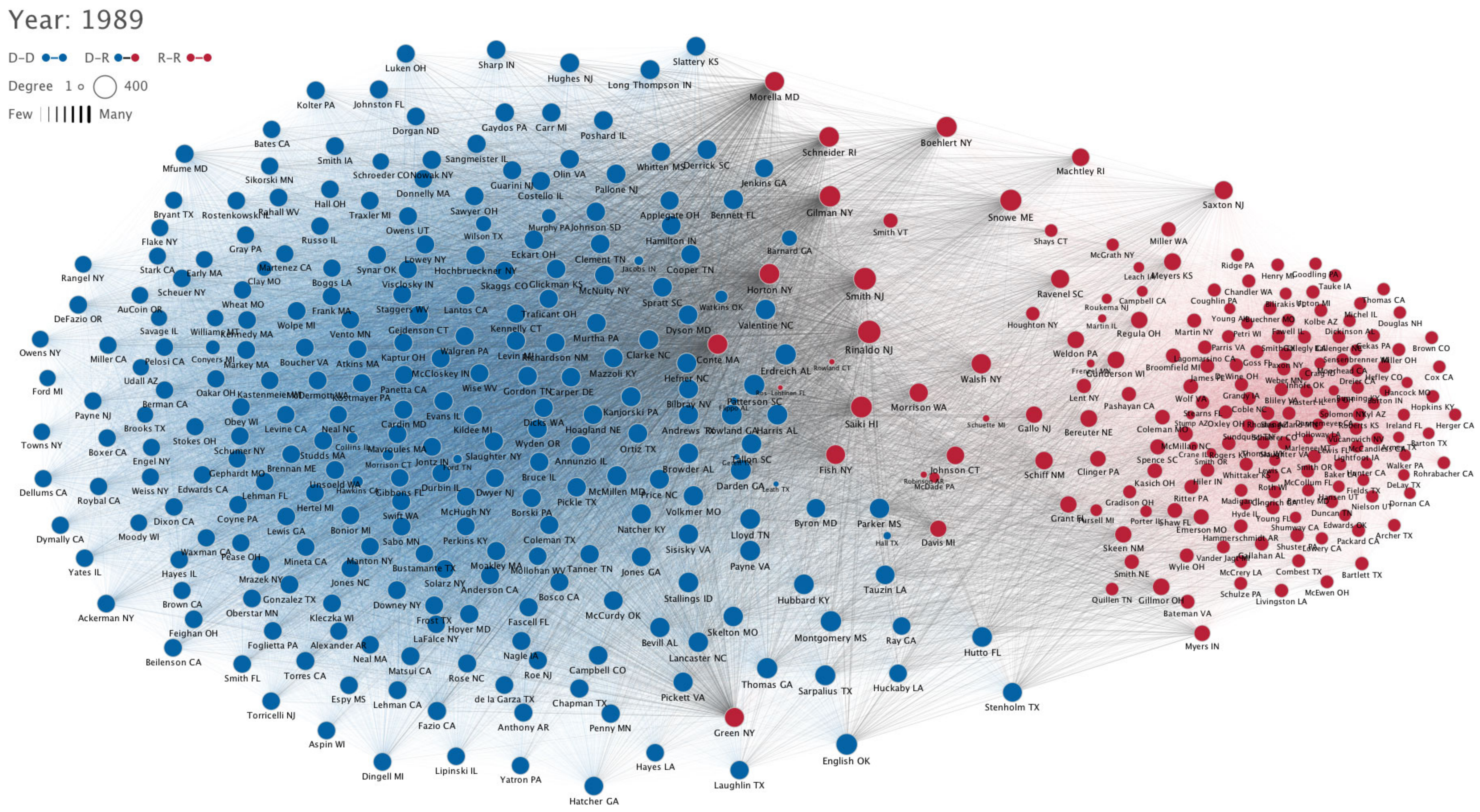
Martin IL
Schneider RI
Minish NJ
Green NY
Leach IA
Fish NY
Fenwick NJ
Atkinson PA
Heckler MA
DeNardis CT
McKinney CT
McDade PA
Coyne PA
McClory IL
Nowak NY
Kildee MI
Shamansky OH
Porter IL
Emery ME
Coughlin PA
Young FL
Studds MA
Pease OH
Hollenbeck NJ
Hughes NJ
Conte MA
Erdahl MN
Lent NY
Gunderson WI
Courter NJ
Roth WI
Peyser NY
Ratchford CT
Horton NY
Davis MI
Findley IL
Deckard IN
Lujan NM
Carman NY
Coats IN
Sensenbrenner WI
Seiberling OH
Walgren PA
Murphy PA
Railsback IL
Gradison OH
Downey NY
Wolpe MI
Jacobs IN
D'Amours NH
Young MO
Hamilton IN
Smith NJ
Weber OH
Madigan IL
Broomfield MI
Gregg NH
Markey MA
Schroeder CO
Mineta CA
McGrath NY
Evans IA
Fiedler CA
Martin NY
Bailey MO
Stokes OH
Kastenmeier WI
Washington IL
Coyne PA
Dunn MI
O'Brien IL
Kemp NY
Kramer CO
Oberstar MN
Mitchell MD
AuCoin OR
Dwyer NJ
Fithian IN
Sharp IN
Purcell MI
Marriott UT
Goodling PA
Quillen TN
Weber MN
Hiler IN
Brodhead MI
Garcia NY
Synar OK
Rosenthal NY
Rinaldo NJ
Derwinski IL
Wyden OR
Conyers MI
Gibbons FL
Snowe ME
Corcoran IL
LeBoutillier NY
Barnes MD
Vento MN
Harkin IA
Evans IN
Annunzio IL
Regula OH
Hopkins KY
Daub NE
Ritter PA
Miller OH
McCollum FL
Miller CA
Bonker WA
Eckart OH
Zeferetti NY
Pritchard WA
Wolf VA
Lee NY
Michel IL
Staton WV
Dannemeyer CA
Sabo MN
Edwards CA
Dymally CA
Clay MO
Natcher KY
Burgener CA
Brown CO
Ottinger NY
Solarz NY
Pepper FL
Gore TN
Bereuter NE
Moore LA
Schumer NY
Stark CA
Benjamin IN
Dougherty PA
Oxley OH
Hunter CA
Bliley VA
Conable NY
Schulze PA
Broyhill NC
Solomon NY
Frank MA
Rodino NJ
Dellums CA
Ford MI
McHugh NY
Swift WA
Anderson CA
Applegate OH
Jones NC
Stanton OH
Molinari NY
Smith NE
Bethune AR
Craig ID
Lewis CA
Weaver OR
Williams MT
Campbell SC
Siljander MI
Latta OH
Edgar PA
Byron MD
Brinkley GA
Morrison WA
Whittaker KS
Kindness OH
Hartnett SC
Collins IL
Gray PA
Yates IL
Gejdenson CT
Shannon MA
Mikulski MD
Guarini NJ
Matsui CA
Panetta CA
Jones TN
Grisham CA
Rousselot CA
Crane IL
Moorhead CA
Jeffries KS
Burton CA
Leland TX
Howard NJ
Florio NJ
Johnston NC
Collins TX
Walker PA
Archer TX
Weiss NY
Wirth CO
Yatron PA
Dyson MD
Skeen NM
McDonald GA
Dickinson AL
Lott MS
Fields TX
Bingham NY
Waxman CA
Biaggi NY
Dorgan ND
Smith IA
Mollohan WV
Jeffords VT
Andrews NC
Skelton MO
Clinger PA
Wylie OH
Parris VA
Winn KS
Lungren CA
Scheuer NY
St. Germain RI
Holland SC
Bennett FL
Ireland FL
Daniel VA
Roberts KS
Smith OR
Beilenson CA
Rangel NY
LaFalce NY
Ferraro NY
Perkins KY
McEwen OH
Daniel VA
Loeffler TX
Butler VA
Hansen UT
Cheney WY
Lowry WA
Roybal CA
Pickle TX
Clausen CA
Obey WI
Bonior MI
Boland MA
Kogovsek CO
Mica FL
Evans GA
Hutto FL
Sawyer MI
Shaw FL
Badham CA
Dreier CA
Hansen ID
Hawkins CA
Lehman FL
Dowdy MS
Beard TN
Smith AL
Ford TN
Addabbo NY
Hertel MI
Foley WA
Mazzoli KY
Bailey PA
Mottl OH
Wortley NY
Hyde IL
Lagomarsino CA
Benedict WV
Lowery CA
Frenzel MN
Martin NC
Mavroules MA
Coelho CA
Levitas GA
Hammerschmidt AR
Petri WI
Holt MD
Erlenborn IL
Shuster PA
Gramm TX
Reuss WI
Early MA
Brown CA
Wilson TX
Chappell FL
Nelligan PA
Shumway CA
Thomas CA
Moakley MA
Dixon CA
Patterson CA
Fazio CA
Dicks WA
Rose NC
Hightower TX
Edwards OK
Rudd AZ
Bedell IA
Oakar OH
Robinson VA
Roberts SD
Albosta MI
Gaydos PA
Volkmer MO
Hefner NC
Myers IN
Hagedorn MN
Stangeland MN
Stump AZ
Donnelly MA
Long MD
English OK
Duncan TN
Rogers KY
Spence SC
Stenholm TX
Hendon NC
Lundine NY
Traxler MI
Simon IL
Rostenkowski IL
Gephardt MO
Kazen TX
Bevill AL
Tauzin LA
Livingston LA
Aspin WI
Taylor MO
Emerson MO
Daschle SD
Price IL
Zablocki WI
Breaux LA
Snyder KY
Roemer LA
Dingell MI
Gonzalez TX
Pashayan CA
Marlenee MT
Hoyer MD
Akaka HI
Whitten MS
Mitchell NY
Coleman MO
Russo IL
Roe NJ
Brooks TX
Stratton NY
Whitley NC
Shelby AL
Vander Jagt MI
Whitehurst VA
Chappie CA
Fascell FL
Luken OH
Heftel HI
Gingrich GA
Lantos CA
Patman TX
Trible VA
Hall OH
Derrick SC
Hance TX
Boggs LA
Anthony AR
Huckaby LA
Edwards AL
Carney NY
Udall AZ
Rahall WV
Boner TN
Flippo AL
Nelson FL
Hillis IN
Frost TX
Neal NC
Fountain NC
Montgomery MS
Wampler VA
Fowler GA
Alexander AR
McCurdy OK
Barnard GA
Hall TX
Napier SC
Hatcher GA
Fary IL
Long LA
de la Garza TX
Jones OK
Lloyd TN
Hubbard KY
Jenkins GA
Leath TX
Wright TX
Murtha PA
Fuqua FL
Watkins OK
White TX
Hall TX
Bowen MS
Nichols AL



Year: 1983
D–D
D–R
R–R
Degree 1
400
Few
Many
Rowland GA
Sisisky VA
Gilman NY
Mollohan WV
Dowdy MS
Wright TX
Roe NJ
Wheat MO
Daschle SD
Boland MA
Boggs LA
Mineta CA
Derrick SC
Gaydos PA
Jones TN
Hatcher GA
Flippo AL
Stratton NY
Hutto FL
Vandergriff TX
Smith NJ
Hall TX
Montgomery MS
Erdreich AL
Nichols AL
Patman TX
Lloyd TN
Chappell FL
McCurdy OK
Fuqua FL
Murtha PA
Sharp IN
Pepper FL
LaFalce NY
McHugh NY
Ratchford CT
Hoyer MD
Jones NC
Anthony AR
Long LA
Ortiz TX
Coelho CA
Kogovsek CO
Foley WA
Akaka HI
Miller CA
Scheuer NY
Bates CA
Synar OK
Andrews NC
Mica FL
Watkins OK
Kazen TX
Breaux LA
Barnard GA
Yates IL
Traxler MI
Rostenkowski IL
McCloskey IN
Valentine NC
Jenkins GA
Gray PA
Rangel NY
Beilenson CA
Edwards CA
Florio NJ
Smith FL
Gephardt MO
Kennelly CT
Young MO
Cooper TN
Gibbons FL
Coleman TX
Price IL
Ford TN
Brown CA
Guarini NJ
Rahall WV
Alexander AR
Natcher KY
Olin VA
Huckaby LA
Seiberling OH
Studds MA
Mikulski MD
Bonker WA
Fascell FL
Matsui CA
Staggers WV
Ray GA
Owens NY
Gejdenson CT
Boxer CA
Obey WI
Mazzoli KY
McDade PA
Shelby AL
Hubbard KY
Lundine NY
Conyers MI
Biaggi NY
Levine CA
Perkins KY
Kaptur OH
Dwyer NJ
Oakar OH
Levin MI
MacKay FL
Yatron PA
Skelton MO
Horton NY
Nelson FL
Waxman CA
Morrison CT
Burton CA
Edgar PA
Leland TX
Ford MI
Rodino NJ
Bryant TX
Coyne PA
Swift WA
Clarke NC
Luken OH
Davis MI
Bonior MI
Dymally CA
Lehman FL
Wyden OR
Tallon SC
Gramm TX
Ottinger NY
Towns NY
Schumer NY
Hawkins CA
Solarz NY
Kastenmeier WI
Mavroules MA
Kostmayer PA
Nowak NY
Patterson CA
Carr MI
Boucher VA
Wise WV
Annunzio IL
Hefner NC
Volkmer MO
Andrews TX
Duncan TN
Shannon MA
Crockett MI
Hall IN
Fish NY
Clinger PA
Collins IL
Berman CA
Clay MO
Sabo MN
Lowry WA
Foglietta PA
Ferraro NY
Russo IL
Lipinski IL
Fazio CA
de la Garza TX
Anderson CA
Bevill AL
Whitley NC
Vento MN
Markey MA
Garcia NY
Bosco CA
St Germain RI
Torres CA
Moakley MA
Sikorski MN
Long MD
McNulty AZ
Wolpe MI
Borski PA
Neal NC
Albosta MI
Boner TN
Jones OK
McKernan ME
Mitchell MD
Wirth CO
Byron MD
Savage IL
Oberstar MN
Addabbo NY
Frank MA
Donnelly MA
Aspin WI
Fowler GA
Kildee MI
McKinney CT
Britt NC
Stark CA
Jacobs IN
Levitas GA
Dixon CA
Dellums CA
Weiss NY
Rose NC
Evans IL
Richardson NM
Gore TN
Whitten MS
Jeffords VT
Hughes NJ
Leach IA
Hightower TX
Roukema NJ
Early MA
Hall OH
Harrison PA
Roybal CA
Lantos CA
Frost TX
Applegate OH
Panetta CA
Harkin IA
Williams MT
Udall AZ
Dingell MI
Kolter PA
Brooks TX
Carper DE
Slattery KS
Smith IA
Weaver OR
Schroeder CO
Downey NY
Walgren PA
Eckart OH
Dyson MD
Rinaldo NJ
Johnson CT
Stokes OH
Ackerman NY
Lehman CA
D'Amours NH
Barnes MD
Gonzalez TX
Murphy PA
Pickle TX
Hamilton IN
Bennett FL
Howard NJ
Mrazek NY
Penny MN
Spratt SC
English OK
AuCoin OR
Torricelli NJ
Minish NJ
Pease OH
Boehlert NY
Dorgan ND
Reid NV
Schneider RI
Green NY
Hertel MI
Moody WI
Durbin IL
Bedell IA
Dicks WA
Conte MA
Glickman KS
Thomas GA
Snowe ME
Feighan OH
Regula OH
Ridge PA
Tauzin LA
Hall TX
Gunderson WI
Porter IL
Morrison WA
Tauke IA
Moore LA
Zschau CA
Coats IN
Gradison OH
Daub NE
Hopkins KY
Edwards OK
Siljander MI
Hyde IL
Roemer LA
Coleman MO
Chandler WA
Myers IN
Bereuter NE
Young AK
Coughlin PA
Evans IA
Pursell MI
Smith NE
Kasich OH
Wolf VA
Goodling PA
Roth WI
Campbell SC
Skeen NM
Stenholm TX
Quillen TN
Hammerschmidt AR
Lent NY
Snyder KY
Daniel VA
Rogers KY
Edwards AL
Leath TX
Sawyer MI
Lujan NM
Taylor MO
Winn KS
Young FL
Bliley VA
Ireland FL
Packard CA
Moorhead CA
Bartlett TX
Burton IN
Nielson UT
Shumway CA
Dannemeyer CA
Walker PA
Lungren CA
Archer TX
McCandless CA
O'Brien IL
Molinari NY
Lewis FL
Ritter PA
Lott MS
McCollum FL
Hillis IN
Wylie OH
Fiedler CA


Year: 1985
D-D
D-R
R-R
Degree 1
400
Few
Many


Year: 1987
D–D
D–R
R–R
Degree 1 400
Few Many
Levine CA
Boxer CA
Durbin IL
Slattery KS
Hawkins CA
Pepper FL
Jacobs IN
Andrews TX
Patterson SC
Schneider RI
Collins IL
Coelho CA
Mavroules MA
Chappell FL
Kaptur OH
Bonior MI
Lehman CA
Foglietta PA
Savage IL
Hughes NJ
Glickman KS
Gilman NY
Ravenel SC
Edwards CA
Dymally CA
Sabo MN
Weiss NY
Kostmayer PA
Bruce IL
Sisisky VA
Boehlert NY
Rowland GA
Huckaby LA
Rinaldo NJ
Owens NY
Schroeder CO
Johnson CT
Towns NY
Stark CA
Fish NY
Snowe ME
Smith NE
Early MA
Miller WA
Brown CA
Morrison WA
Stenholm TX
Conyers MI
Dellums CA
Smith NJ
Hall TX
Rodino NJ
Green NY
Hutto FL
Penny MN
Montgomery MS
McDade PA
Saiki HI
Horton NY
Davis MI
Rangel NY
Brooks TX
Jeffords VT
Byron MD
Studds MA
DeFazio OR
Rahall WV
Dingell MI
Murtha PA
Flippo AL
Hubbard KY
Jenkins GA
Stratton NY
Regula OH
Oxley OH
Lightfoot IA
Goodling PA
Martin IL
Ireland FL
Burton IN
Inhofe OK



Year: 1989
D–D
D–R
R–R
Degree 1
400
Few
Many
Luken OH
Sharp IN
Hughes NJ
Long Thompson IN
Slattery KS
Morella MD
Kolter PA
Johnston FL
Dorgan ND
Gaydos PA
Carr MI
Poshard IL
Bates CA
Mfume MD
Smith IA
Sangmeister IL
Schroeder CO
Nowak NY
Olin VA
Whitten MS
Derrick SC
Jenkins GA
Schneider RI
Boehlert NY
Machtley RI
Saxton NJ
Sikorski MN
Hall OH
Donnelly MA
Guarini NJ
Costello IL
Pallone NJ
Gilman NY
Snowe ME
Bryant TX
Rostenkowski IL
Rahall WV
Traxler MI
Sawyer OH
Applegate OH
Bennett FL
Smith VT
Shays CT
Miller WA
Owens UT
Murphy PA
Johnson SD
Wilson TX
Flake NY
Russo IL
Gray PA
Hamilton IN
Barnard GA
McGrath NY
Lowey NY
Eckart OH
Clement TN
Stark CA
Early MA
Martenez CA
Synar OK
Hochbrueckner NY
Jacobs IN
Cooper TN
Rangel NY
Clay MO
Boggs LA
Visclosky IN
Skaggs CO
Glickman KS
McNulty NY
Horton NY
Smith NJ
Ravenel SC
Scheuer NY
Wheat MO
Spratt SC
Watkins OK
DeFazio OR
AuCoin OR
Frank MA
Staggers WV
Lantos CA
Traficant OH
Valentine NC
Houghton NY
Savage IL
Williams MT
Kennedy MA
Wolpe MI
Vento MN
Gejdenson CT
Kennelly CT
Dyson MD
Owens NY
Miller CA
Pelosi CA
Conyers MI
Markey MA
Boucher VA
Atkins MA
Kaptur OH
Walgren PA
Murtha PA
Levin MI
Richardson NM
Clarke NC
Conte MA
Rinaldo NJ
Weldon PA
Regula OH
Ford MI
Udall AZ
Oakar OH
Kastenmeier WI
McDermott WA
Rostmayer PA
Panetta CA
McCloskey IN
Wise WV
Gordon TN
Carper DE
Mazzoli KY
Hefner NC
Erdreich AL
Rowland CT
Walsh NY
Gunderson WI
Payne NJ
Berman CA
Obey WI
Levine CA
Neal NC
Cardin MD
Evans IL
Kildee MI
Dicks WA
Kanjorski PA
Bilbray NV
Patterson SC
Morrison WA
Saiki HI
Lent NY
Pashayan CA
Towns NY
Brooks TX
Stokes OH
Schumer NY
Collins IL
Mavroules MA
Slaughter NY
Wyden OR
Hoagland NE
Andrews TX
Rowland GA
Harris AL
Gallo NJ
Bereuter NE
Coleman MO
Boxer CA
Engel NY
Studds MA
Brennan ME
Morrison CT
Jontz IN
Ford TN
Annunzio IL
Ortiz TX
Callon SC
Fish NY
Johnson CT
Schiff NM
Clinger PA
Dellums CA
Weiss NY
Gephardt MO
Edwards CA
Unsoeld WA
Hawkins CA
Gibbons FL
Durbin IL
Dwyer NJ
Bruce IL
McMillen MD
Price NC
Browder AL
Darden GA
Robinson AR
McDade PA
Kasich OH
Roybal CA
Lehman FL
Hertel MI
Swift WA
McHugh NY
Borski PA
Pickle TX
Volkmer MO
Byron MD
Parker MS
Grant FL
Dixon CA
Coyne PA
Lewis GA
Bonior MI
Sabo MN
Perkins KY
Coleman TX
Natcher KY
Lloyd TN
Hall TX
Davis MI
Skeen NM
Dymally CA
Moody WI
Waxman CA
Pease OH
Mineta CA
Manton NY
Bustamante TX
Moakley MA
Mollohan WV
Tanner TN
Jones GA
Sisisky VA
Payne VA
Smith NE
Yates IL
Hayes IL
Mrazek NY
Jones NC
Solarz NY
Anderson CA
Bosco CA
Stallings ID
Hubbard KY
Tauzin LA
Quillen TN
Gillmor OH
Bateman VA
Ackerman NY
Brown CA
Gonzalez TX
Oberstar MN
Kleczka WI
Downey NY
Frost TX
Hoyer MD
Fascell FL
McCurdy OK
Feighan OH
Foglietta PA
Alexander AR
LaFalce NY
Bevill AL
Skelton MO
Montgomery MS
Ray GA
Hutto FL
Myers IN
Beilenson CA
Smith FL
Torres CA
Neal MA
Matsui CA
Rose NC
Nagle IA
Roe NJ
Campbell CO
Lancaster NC
Pickett VA
Thomas GA
Sarpalius TX
Huckaby LA
Stenholm TX
Torricelli NJ
Espy MS
Lehman CA
de la Garza TX
Chapman TX
Fazio CA
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Green NY
Aspin WI
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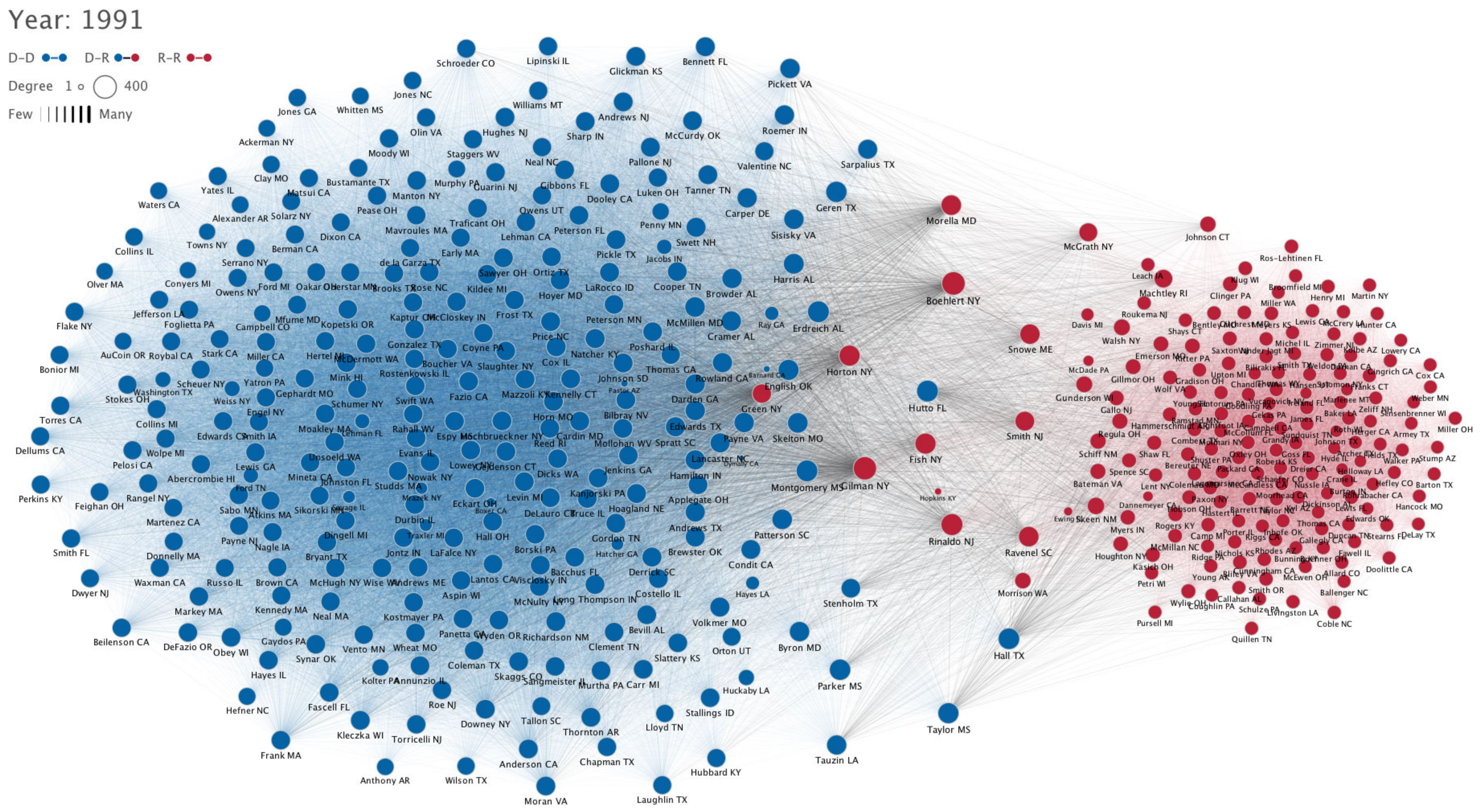
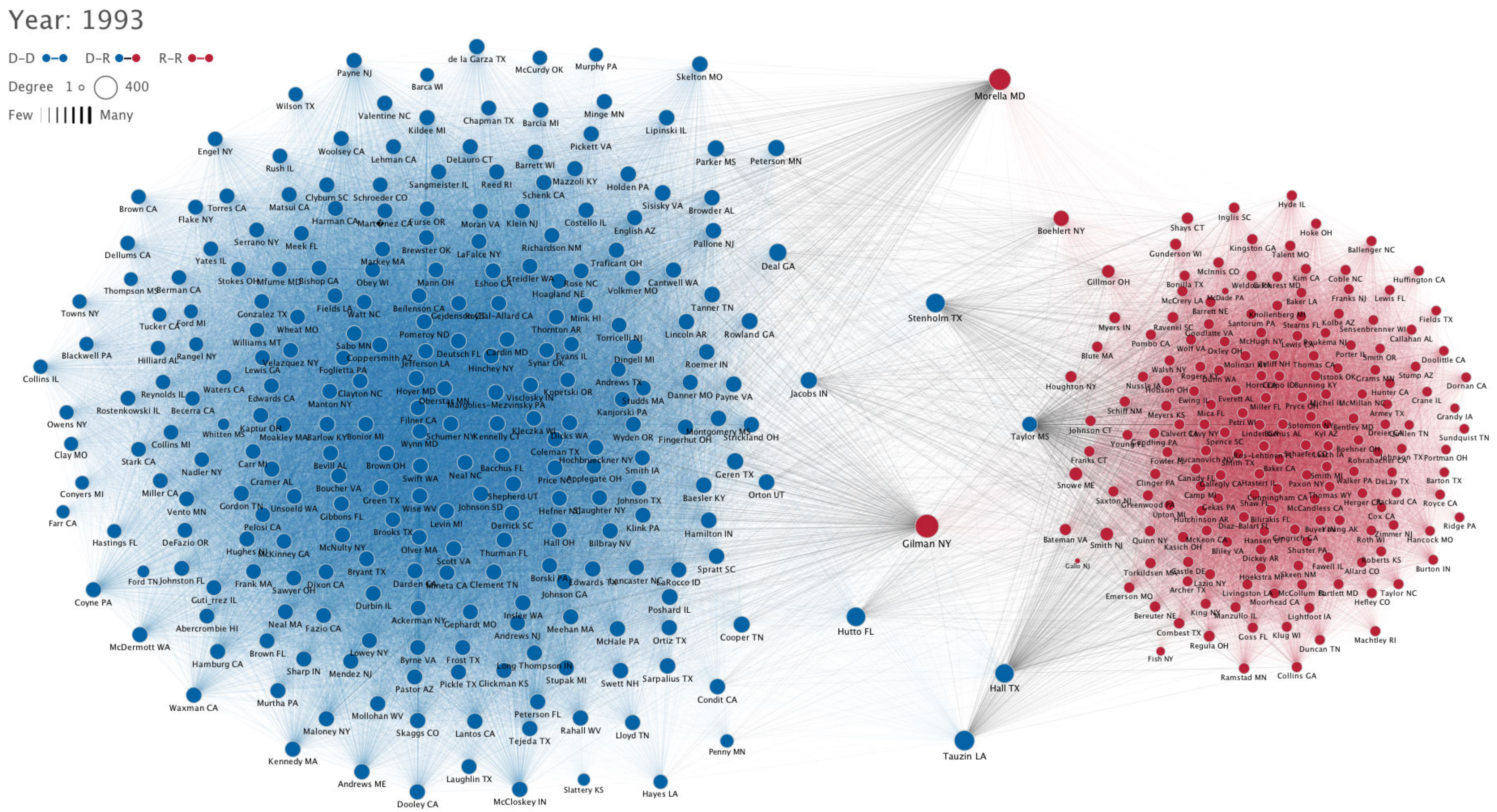
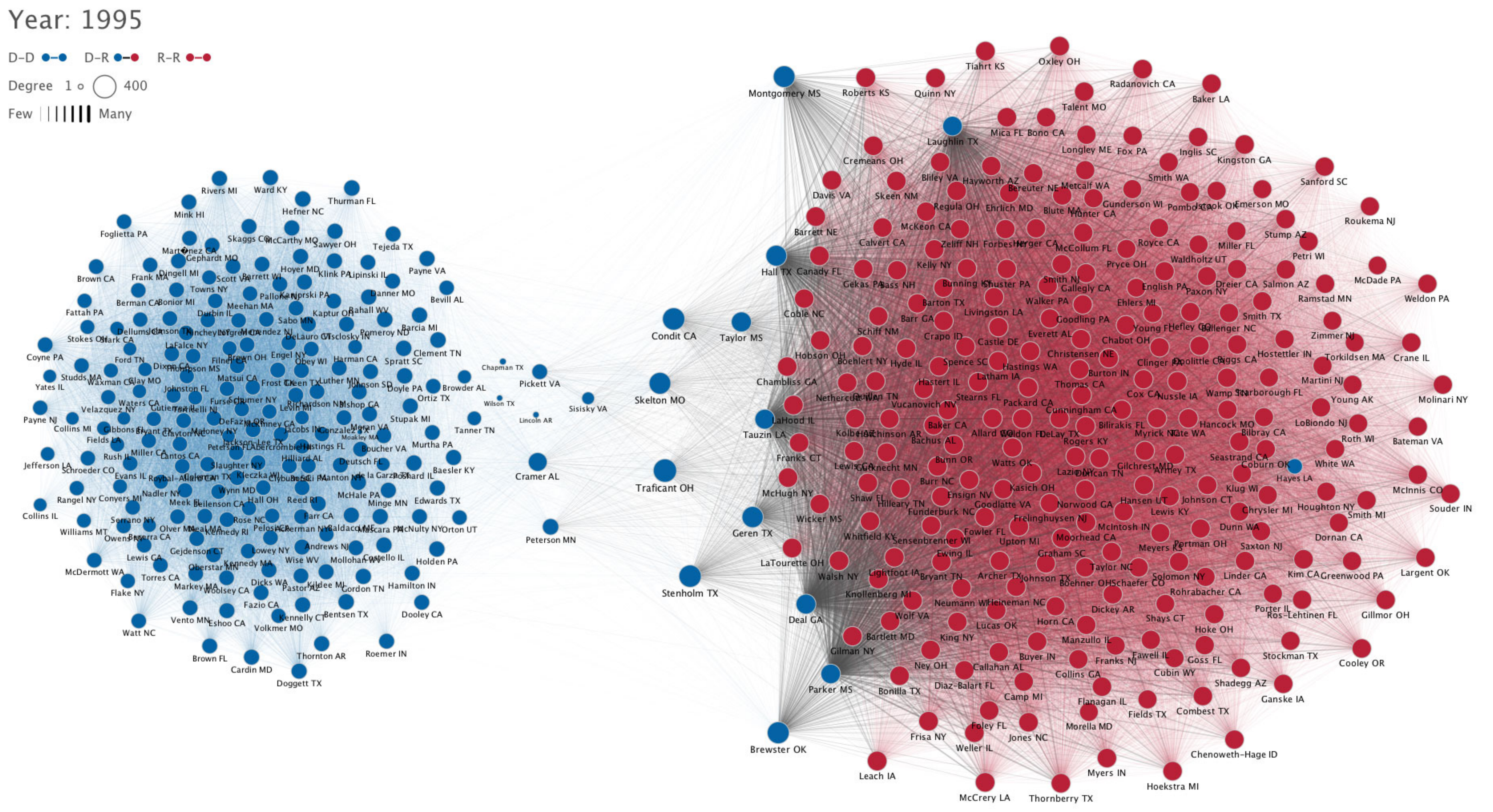
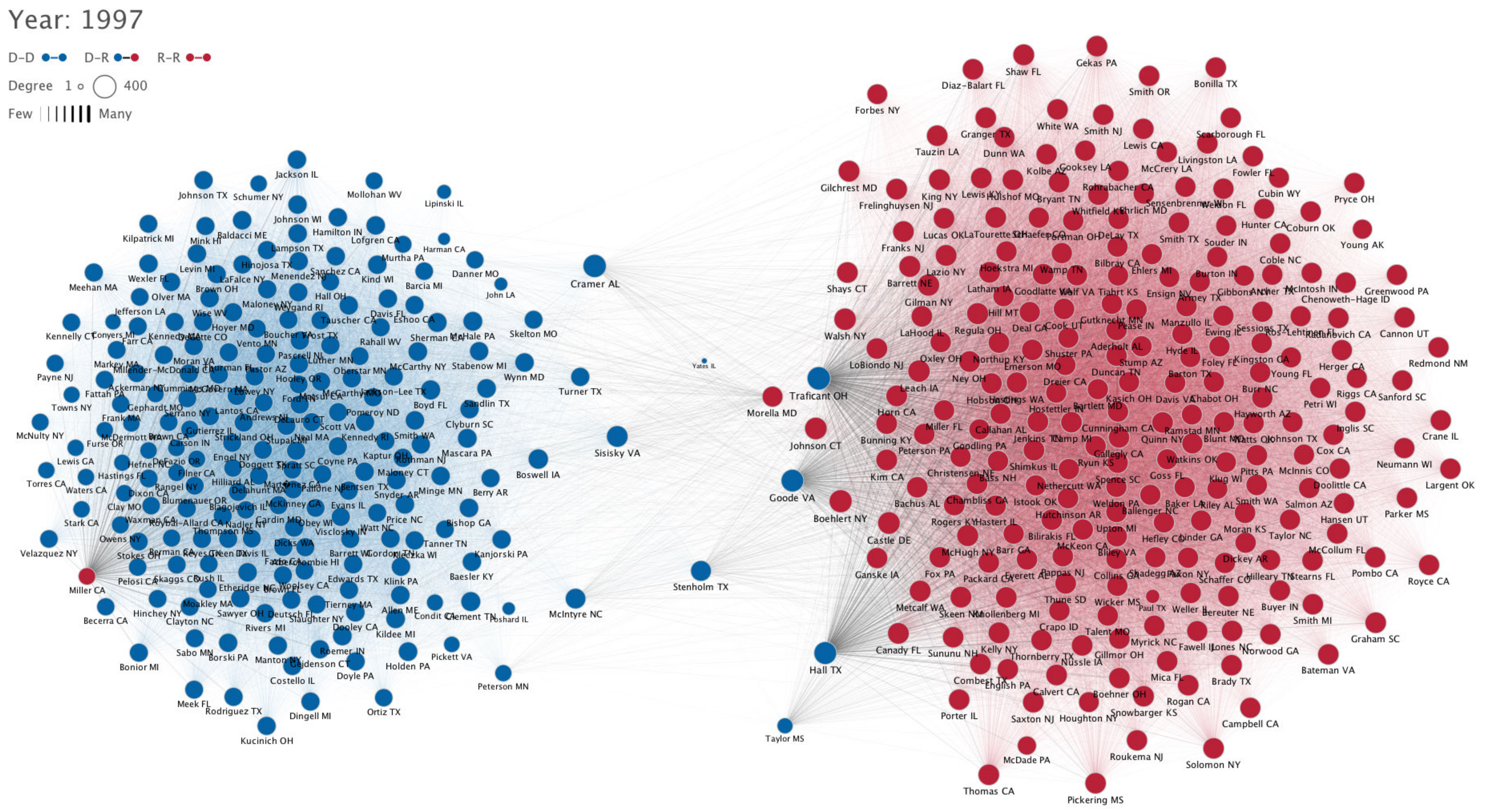
Lipinski IL
Yatron PA
Hayes LA
Laughlin TX
English OK
Hatcher GA

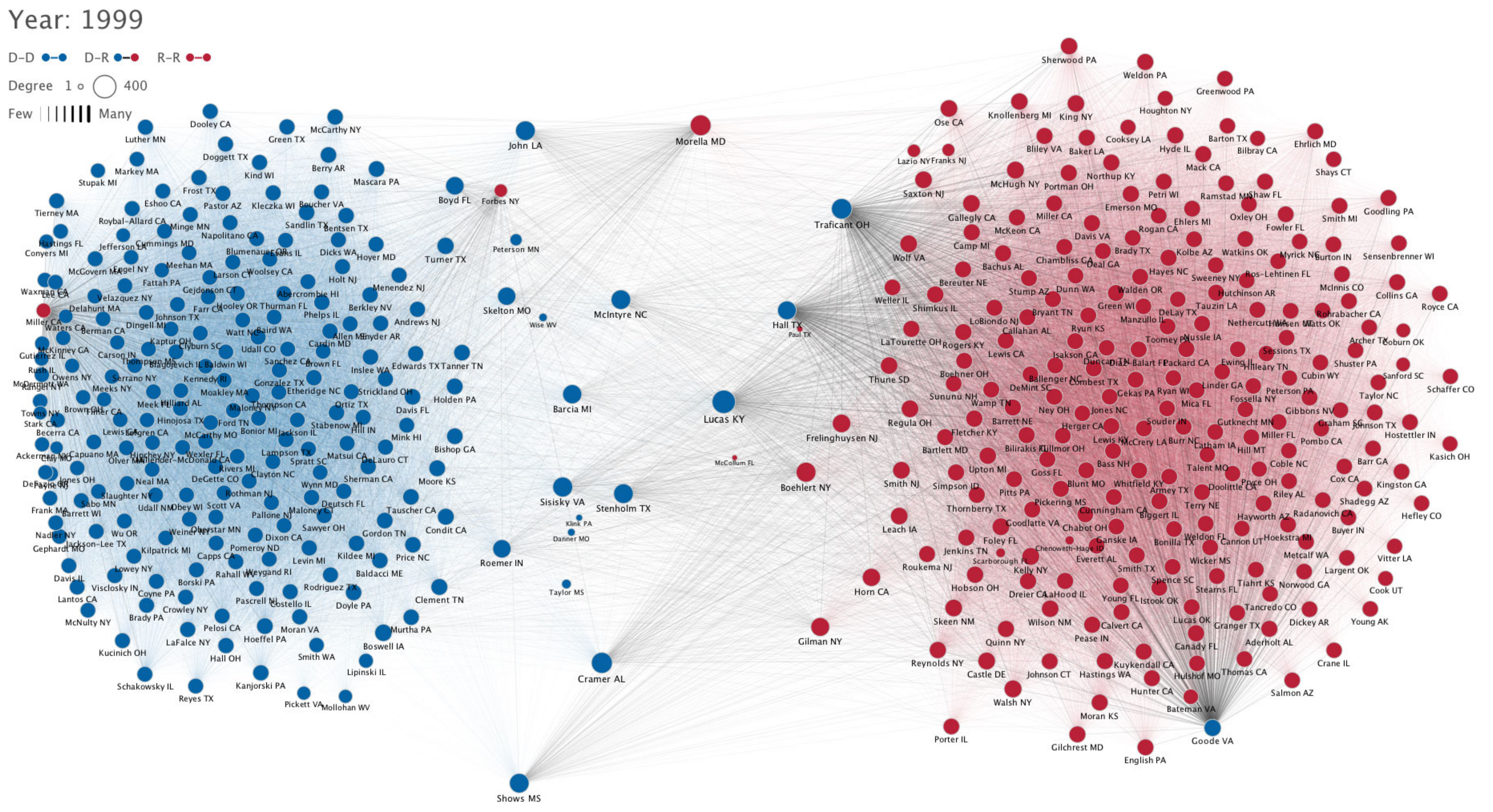

Year: 1991
D–D
D–R
R–R
Degree 1
400
Few
Many
Schroeder CO
Lipinski IL
Glickman KS
Bennett FL
Pickett VA
Jones NC
Williams MT
Andrews NJ
Jones GA
Whitten MS
Olin VA
Hughes NJ
Sharp IN
McCurdy OK
Roemer IN
Ackerman NY
Moody WI
Staggers WV
Neal NC
Pallone NJ
Valentine NC
Sarpalius TX
Clay MO
Bustamante TX
Murphy PA
Guarini NJ
Gibbons FL
Luken OH
Tanner TN
Yates IL
Matsui CA
Manton NY
Dooley CA
Carper DE
Geren TX
Waters CA
Alexander AR
Solarz NY
Pease OH
Traficant OH
Owens UT
Penny MN
Morella MD
Johnson CT
Mavroules MA
Peterson FL
Sisisky VA
McGrath NY
Collins IL
Towns NY
Berman CA
Dixon CA
Lehman CA
Swett NH
Ros-Lehtinen FL
Early MA
Pickle TX
Jacobs IN
Olver MA
Serrano NY
de la Garza TX
Harris AL
Leach IA
Conyers MI
Sawyer OH
Ortiz TX
Klug WI
Owens NY
Ford MI
Oakar OH
Oberstar MN
Brooks TX
Rose NC
Kildee MI
Hoyer MD
LaRocco ID
Cooper TN
Browder AL
Boehlert NY
Machtley RI
Clinger PA
Broomfield MI
Henry MI
Martin NY
Mfume MD
Kaptur OH
McCloskey IN
Frost TX
Miller WA
Jefferson LA
Roukema NJ
Flake NY
Foglietta PA
Campbell CO
Kopetski OR
Price NC
Peterson MN
McMillen MD
Ray GA
Erdreich AL
Davis MI
Hunter CA
Cramer AL
Snowe ME
Walsh NY
AuCoin OR
Roybal CA
Stark CA
Miller CA
Hertel MI
Gonzalez TX
Coyne PA
Natcher KY
Poshard IL
McDermott WA
Boucher VA
Slaughter NY
Cox IL
Thomas GA
Bonior MI
Emerson MO
Ritter PA
Scheuer NY
Yatron PA
Mink HI
Rostenkowski IL
Johnson SD
Rowland GA
Horton NY
Barnard GA
McDade PA
Gillmor OH
Lowery CA
Cox CA
Washington TX
Gephardt MO
Weiss NY
Fazio CA
Mazzoli KY
Kennelly CT
English OK
Pastor AZ
Darden GA
Gradison OH
Wolf VA
Franks CT
Stokes OH
Schumer NY
Swift WA
Hutto FL
Gunderson WI
Weber MN
Torres CA
Engel NY
Horn MO
Bilbray NV
Green NY
Gallo NJ
Collins MI
Edwards CA
Smith IA
Moakley MA
Lehman FL
Rahall WV
Espy MS
Hochbrueckner NY
Cardin MD
Edwards TX
Skelton MO
Smith NJ
Sensenbrenner WI
Miller OH
Dellums CA
Wolpe MI
Reed RI
Mollohan WV
Spratt SC
Payne VA
Regula OH
Armey TX
Pelosi CA
Unsoeld WA
Evans IL
Lancaster NC
Fish NY
Schiff NM
Shaw FL
Stump AZ
Lewis GA
Lowey NY
Gejdenson CT
Dymally CA
Abercrombie HI
Mineta CA
Johnston FL
Dicks WA
Jenkins GA
Hamilton IN
Montgomery MS
Gilman NY
Bateman VA
Spence SC
Barton TX
Perkins KY
Studds MA
Nowak NY
Ford TN
Mrazek NY
Hefley CO
Feighan OH
Rangel NY
Eckart OH
Levin MI
Kanjorski PA
Applegate OH
Hopkins KY
Savage IL
Sabo MN
Atkins MA
Sikorski MN
Boxer CA
DeLauro CT
Bruce IL
Hoagland NE
Hancock MO
Martenez CA
Durbin IL
Ewing IL
Skeen NM
Dannemeyer CA
Myers IN
Rogers KY
Edwards OK
Smith FL
Payne NJ
Traxler MI
Dingell MI
Hall OH
Andrews TX
Patterson SC
Rinaldo NJ
Nagle IA
Borski PA
Gordon TN
Ravenel SC
DeLay TX
Donnelly MA
Jontz IN
LaFalce NY
Hatcher GA
Brewster OK
Condit CA
Bryant TX
Houghton NY
Bacchus FL
Derrick SC
Ridge PA
Doolittle CA
Waxman CA
Russo IL
Brown CA
McHugh NY
Wise WV
Andrews ME
Lantos CA
Visclosky IN
Dwyer NJ
Kasich OH
Hayes LA
Stenholm TX
Long
Thompson IN
Costello IL
Morrison WA
Allard CO
McNulty NY
Petri WI
Young AK
McEwen OH
Markey MA
Kennedy MA
Neal MA
Aspin WI
Ballenger NC
Smith OR
Kostmayer PA
Volkmer MO
Callahan AL
Coughlin PA
Schulze PA
Livingston LA
Beilenson CA
Bevill AL
Pursell MI
Coble NC
Gaydos PA
Panetta CA
Wyden OR
Richardson NM
DeFazio OR
Clement TN
Byron MD
Obey WI
Vento MN
Wheat MO
Orton UT
Quillen TN
Synar OK
Coleman TX
Slattery KS
Hall TX
Hayes IL
Skaggs CO
Sangmeister IL
Kolter PA
Annunzio IL
Murtha PA
Carr MI
Parker MS
Huckaby LA
Hefner NC
Fascell FL
Roe NJ
Stallings ID
Downey NY
Tallon SC
Kleczka WI
Lloyd TN
Taylor MS
Torricelli NJ
Thornton AR
Frank MA
Anderson CA
Chapman TX
Hubbard KY
Tauzin LA
Anthony AR
Wilson TX
Moran VA
Laughlin TX


Year: 1993
D–D
D–R
R–R
Degree 1 400
Few Many
Morella MD
Boehlert NY
Stenholm TX
Jacobs IN
Taylor MS
Gilman NY
Hutto FL
Hall TX
Tauzin LA
Deal GA
Skelton MO
Peterson MN
Parker MS
de la Garza TX
McCurdy OK
Murphy PA
Payne NJ
Barca WI
Wilson TX
Engel NY
Brown CA
Dellums CA
Towns NY
Collins IL
Owens NY
Clay MO
Conyers MI
Farr CA
Coyne PA
McDermott WA
Waxman CA
Kennedy MA
Andrews ME
Dooley CA
McCloskey IN
Slattery KS
Hayes LA
Penny MN
Condit CA
Cooper TN
Orton UT
Geren TX
Strickland OH
Payne VA
Rowland GA
Tanner TN
Pallone NJ
Browder AL
Lipinski IL
Hyde IL
Inglis SC
Shays CT
Hoke OH
Ballenger NC
Huffington CA
Fields TX
Doolittle CA
Dornan CA
Sundquist TN
Ridge PA
Burton IN
Taylor NC
Machtley RI
Collins GA
Ramstad MN
Fish NY
Gallo NJ
Bateman VA
Snowe ME
Houghton NY
Gillmor OH
Blute MA
Johnson CT
Franks CT

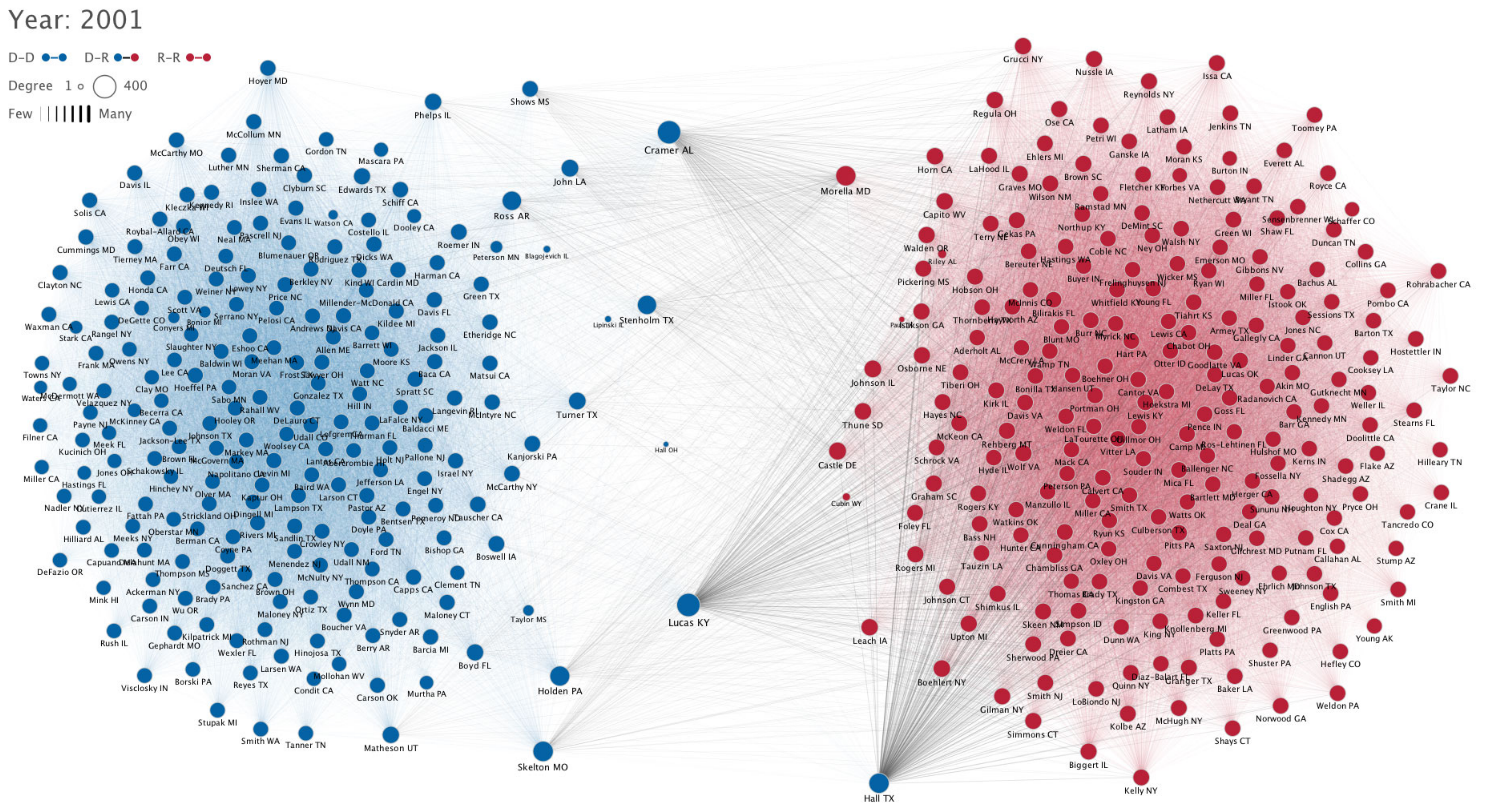


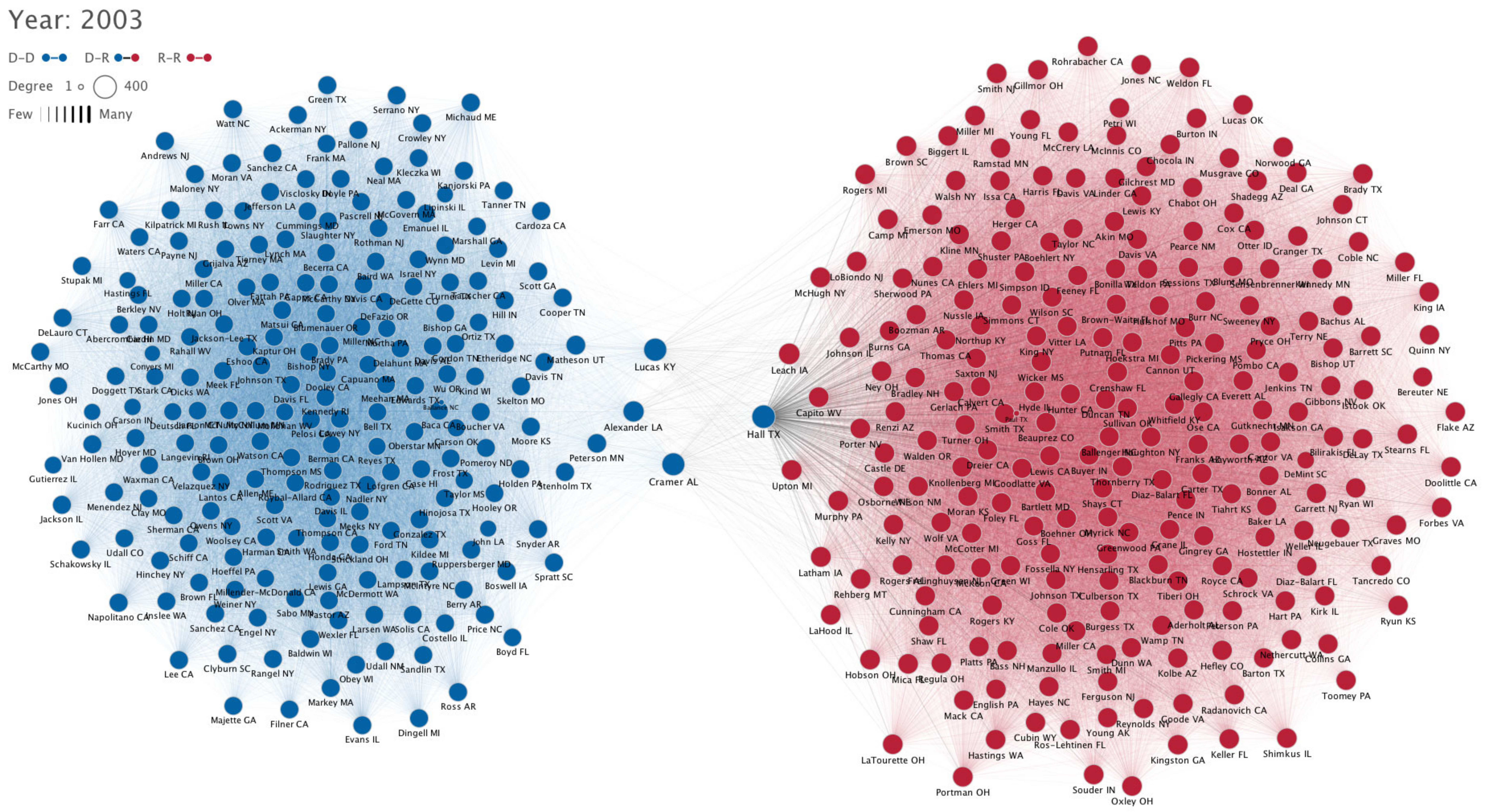
Year: 1995
D–D
D–R
R–R
Degree 1
400
Few
Many
Condit CA
Taylor MS
Skelton MO
Traficant OH
Cramer AL
Peterson MN
Pickett VA
Sisisky VA
Stenholm TX
Montgomery MS
Laughlin TX
Hall TX
Tauzin LA
Geren TX
Deal GA
Parker MS
Brewster OK


Year: 1997
D-D
D-R
R-R
Degree 1
400
Few
Many
Cramer AL
Skelton MO
Turner TX
Sisisky VA
Boswell IA
Stenholm TX
McIntyre NC
Peterson MN
Yates IL
Morella MD
Traficant OH
Johnson CT
Goode VA
Boehlert NY
Hall TX
Taylor MS
Miller CA
Velazquez NY
Kucinich OH
Jackson IL
Gekas PA
Shaw FL
Forbes NY
Thomas CA
Pickering MS
Solomon NY
Largent OK
Royce CA
Graham SC
Bateman VA
Campbell CA

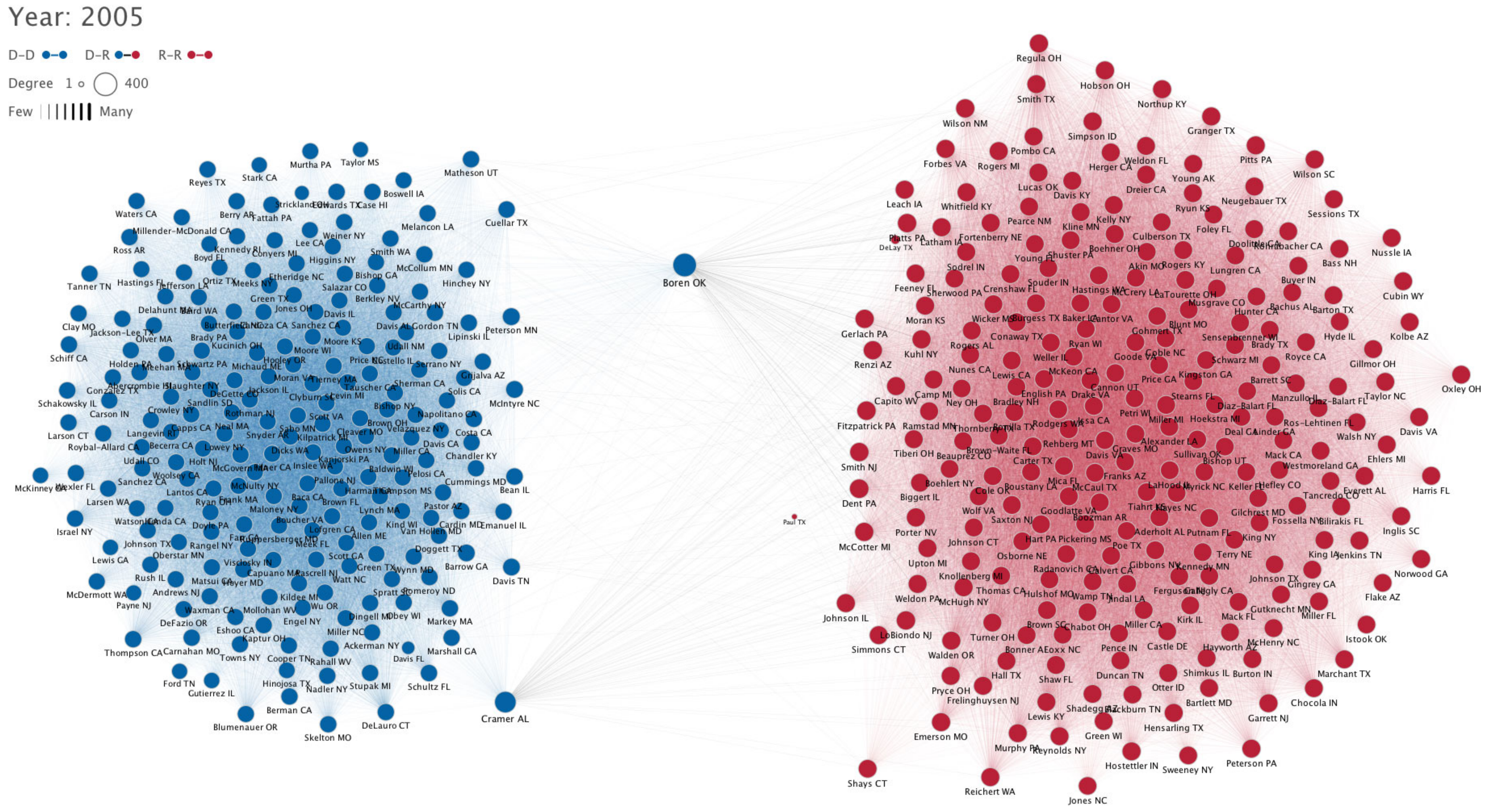


Year: 1999
D–D
D–R
R–R
Degree 1
400
Few
Many
Dooley CA
McCarthy NY
Luther MN
Green TX
John LA
Morella MD
Doggett TX
Berry AR
Markey MA
Kind WI
Mascara PA
Stupak MI
Frost TX
Boyd FL
Forbes NY
Tierney MA
Eshoo CA
Pastor AZ
Kleczka WI
Boucher VA
Roybal-Allard CA
Minge MN
Sandlin TX
Bentsen TX
Hastings FL
Jefferson LA
Cummings MD
Napolitano CA
Peterson MN
Conyers MI
Blumenauer OR
Evans IL
Dicks WA
Hoyer MD
Turner TX
McGovern MA
Engel NY
Meehan MA
Larson CT
Woolsey CA
Holt NJ
Fattah PA
Menendez NJ
Waxman CA
Lee CA
Gejdenson CT
Abercrombie HI
Velazquez NY
Skelton MO
McIntyre NC
Delahunt MA
Farr CA
Hooley OR
Thurman FL
Berkley NV
Wise WV
Miller CA
Johnson TX
Phelps IL
Andrews NJ
Waters CA
Dingell MI
Berman CA
Watt NC
Baird WA
Allen ME
Snyder AR
Cardin MD
Kaptur OH
McKinney GA
Clyburn SC
Udall CO
Gutierrez IL
Carson IN
Thompson MS
Blagojevich IL
Baldwin WI
Sanchez CA
Brown FL
Edwards TX
Tanner TN
Rush IL
Inslee WA
Owens NY
Serrano NY
Kennedy RI
Gonzalez TX
McDermott WA
Meeks NY
Moakley MA
Etheridge NC
Strickland OH
Holden PA
Hilliard AL
Thompson CA
Barcia MI
Towns NY
Meek FL
Filner CA
Maloney NY
Ortiz TX
Davis FL
Stark CA
Hinojosa TX
Ford TN
Stabenow MI
Becerra CA
Lewis GA
Lofgren CA
McCarthy MO
Bonior MI
Jackson IL
Hill IN
Mink HI
Bishop GA
Ackerman NY
Capuano MA
Hinchey NY
Wexler FL
Lampson TX
Matsui CA
Clay MO
Oliver MA
Millender-McDonald CA
Spratt SC
DeLauro CT
Jones OH
Rivers MI
Clayton NC
Moore KS
Neal MA
DeGette CO
Sherman CA
Wynn MD
Sisisky VA
Stenholm TX
Slaughter NY
Rothman NJ
Frank MA
Sabo MN
Udall NM
Obey WI
Scott VA
Deutsch FL
Tauscher CA
Barrett WI
Pallone NJ
Maloney CT
Condit CA
Klink PA
Nadler NY
Sawyer OH
Wu OR
Weiner NY
Oberstar MN
Gordon TN
Danner MO
Gephardt MO
Jackson-Lee TX
Dixon CA
Kilpatrick MI
Pomeroy ND
Capps CA
Kildee MI
Price NC
Roemer IN
Lowey NY
Levin MI
Davis IL
Rahall WV
Weygand RI
Baldacci ME
Borski PA
Visclosky IN
Rodriguez TX
Taylor MS
Coyne PA
Clement TN
Lantos CA
Pascrell NJ
Costello IL
Doyle PA
Crowley NY
Brady PA
McNulty NY
Pelosi CA
Moran VA
Murtha PA
LaFalce NY
Hoeffel PA
Hall OH
Boswell IA
Kucinich OH
Smith WA
Lipinski IL
Cramer AL
Schakowsky IL
Kanjorski PA
Reyes TX
Pickett VA
Mollohan WV
Shows MS
Sherwood PA
Weldon PA
Greenwood PA
Houghton NY
Ose CA
Knollenberg MI
King NY
Cooksey LA
Barton TX
Ehrlich MD
Lazio NY
Franks NJ
Bliley VA
Baker LA
Hyde IL
Bilbray CA
Mack CA
Shays CT
Saxton NJ
Traficant OH
McHugh NY
Portman OH
Northup KY
Petri WI
Ramstad MN
Shaw FL
Goodling PA
Gallegly CA
Miller CA
Emerson MO
Oxley OH
Smith MI
McKeon CA
Ehlers MI
Rogan CA
Fowler FL
Camp MI
Davis VA
Brady TX
Kolbe AZ
Watkins OK
Myrick NC
Burton IN
Sensenbrenner WI
Wolf VA
Bachus AL
Chambliss GA
Deal GA
Hayes NC
Sweeney NY
Ros-Lehtinen FL
Bereuter NE
Stump AZ
Dunn WA
Walden OR
Hutchinson AR
McInnis CO
Collins GA
Royce CA
Weller IL
Shimkus IL
Bryant TN
Green WI
DeLay TX
Tauzin LA
Hall TX
Paul TX
LoBiondo NJ
Manzullo IL
Nethercutt WA
Hansen UT
Watts OK
Rohrabacher CA
Callahan AL
Ryun KS
Toomey PA
Nussle IA
Archer TX
Coburn OK
LaTourette OH
Rogers KY
Lewis CA
Isakson GA
Sessions TX
Duncan TN
Diaz-Balart FL
Packard CA
Ewing IL
Hilleary TN
Shuster PA
Thune SD
Boehner OH
Sanford SC
Ballenger NC
Combest TX
Cubin WY
Sununu NH
DeMint SC
Gekas PA
Ryan WI
Linder GA
Peterson PA
Schaffer CO
Lucas KY
Wamp TN
Fossella NY
Taylor NC
Mica FL
Frelinghuysen NJ
Ney OH
Jones NC
Gibbons NV
Regula OH
Barrett NE
Souder IN
Gutknecht MN
Graham SC
Herger CA
Johnson TX
Fletcher KY
Lewis KY
McCrery LA
Burr NC
Miller FL
Hostettler IN
Latham IA
Pombo CA
Bartlett MD
Bilirakis FL
Gillmor OH
Hill MT
McCollum FL
Kasich OH
Coble NC
Barr GA
Upton MI
Goss FL
Bass NH
Talent MO
Boehlert NY
Cox CA
Pryce OH
Smith NJ
Whitfield KY
Kingston GA
Simpson ID
Blunt MO
Doolittle CA
Armey TX
Pitts PA
Riley AL
Pickering MS
Terry NE
Shadegg AZ
Thornberry TX
Cunningham CA
Biggert IL
Hefley CO
Hayworth AZ
Radanovich CA
Goodlatte VA
Chabot OH
Buyer IN
Leach IA
Foley FL
Ganske IA
Weldon FL
Cannon UT
Hoekstra MI
Bonilla TX
Jenkins TN
Chenoweth-Hage ID
Metcalf WA
Vitter LA
Scarborough FL
Everett AL
Wicker MS
Roukema NJ
Kelly NY
Smith TX
Largent OK
Horn CA
Hobson OH
Spence SC
Tiahrt KS
Norwood GA
Cook UT
Stearns FL
Dreier CA
LaHood IL
Young FL
Istook OK
Tancredo CO
Skeen NM
Lucas OK
Wilson NM
Calvert CA
Granger TX
Dickey AR
Young AK
Gilman NY
Quinn NY
Pease IN
Aderholt AL
Canady FL
Reynolds NY
Castle DE
Johnson CT
Hastings WA
Kuykendall CA
Hulshof MO
Thomas CA
Crane IL
Hunter CA
Salmon AZ
Walsh NY
Moran KS
Bateman VA
Porter IL
Goode VA
Gilchrest MD
English PA

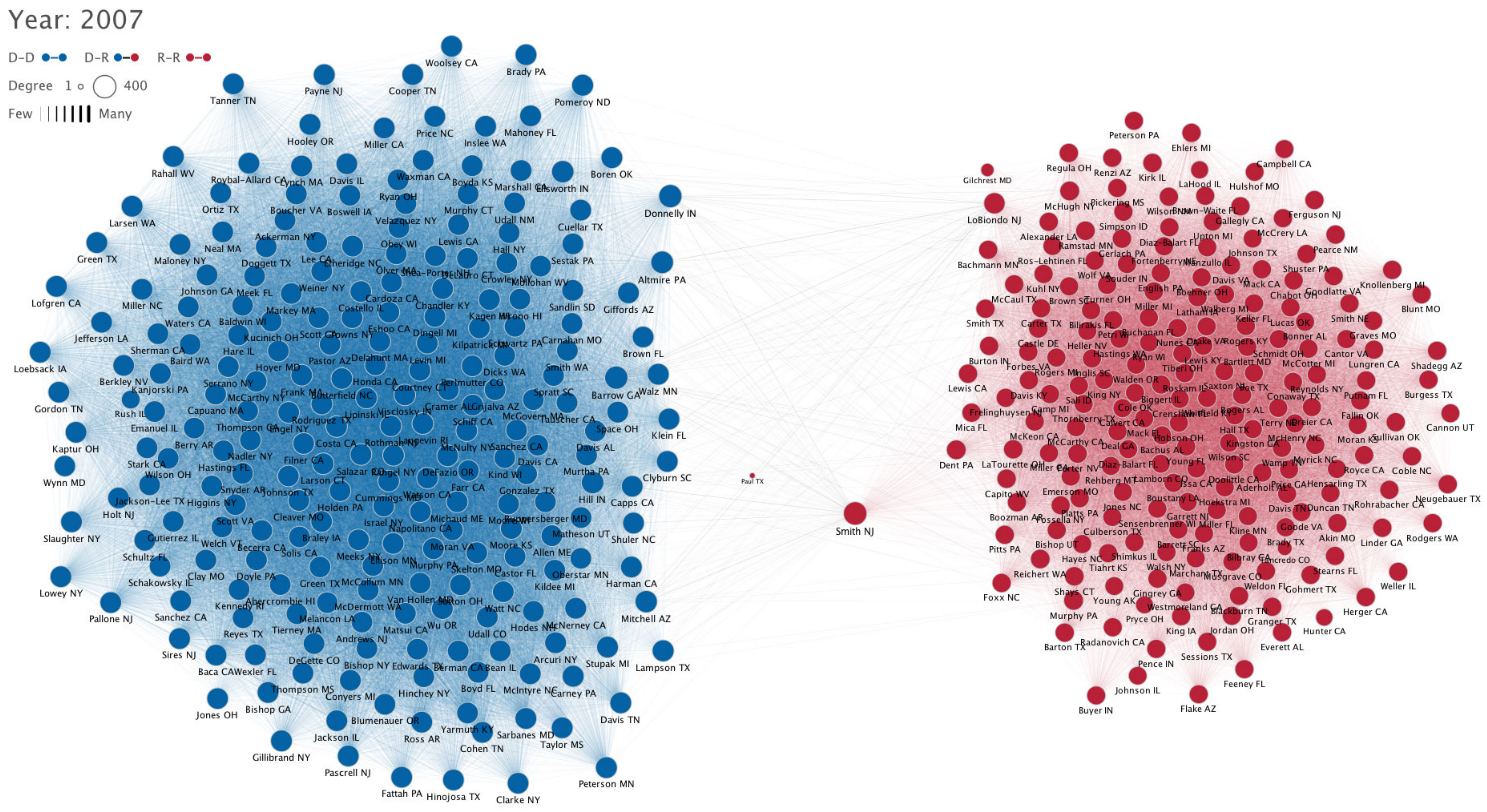

Year: 2001
D–D
D–R
R–R
Degree 1
400
Few
Many
Cramer AL
Morella MD
Stenholm TX
Lucas KY
Hall TX
Skelton MO
Holden PA
Ross AR
Turner TX
John LA
Shows MS
Phelps IL
Hoyer MD



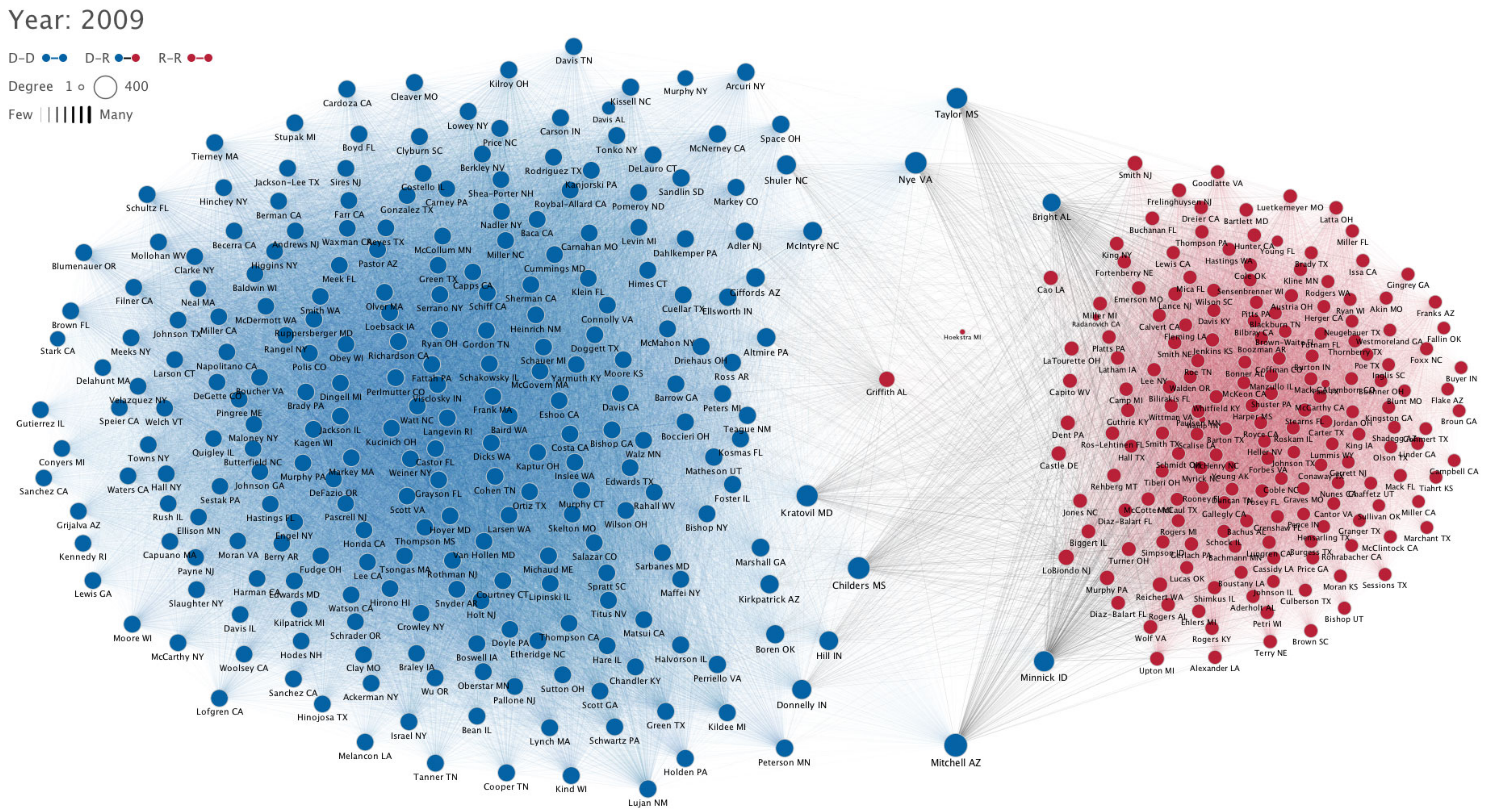
Year: 2003
D-D
D-R
R-R
Degree 1 400
Few Many
Green TX
Serrano NY
Michaud ME
Watt NC
Ackerman NY
Crowley NY
Pallone NJ
Andrews NJ
Frank MA
Sanchez CA
Kleczka WI
Moran VA
Neal MA
Kanjorski PA
Maloney NY
Visclosky IN
Doyle PA
Tanner TN
Jefferson LA
Lipinski IL
Farr CA
Kilpatrick MI
Towns NY
Cummings MD
Pascrell NJ
McGovern MA
Cardoza CA
Emanuel IL
Slaughter NY
Waters CA
Payne NJ
Rothman NJ
Marshall GA
Lynch MA
Tierney MA
Wynn MD
Levin MI
Grijalva AZ
Becerra CA
Stupak MI
Miller CA
Baird WA
Israel NY
Scott GA
Hastings FL
Fattah PA
DeGette CO
Berkley NV
Ryan OH
Hill IN
Cooper TN
DeFazio OR
Matsui CA
Blumenauer OR
Bishop GA
DeLauro CT
Ortiz TX
Rahall WV
Kaptur OH
Etheridge NC
Matheson UT
Lucas KY
McCarthy MO
Conyers MI
Eshoo CA
Bishop NY
Delahunt MA
Davis TN
Meek FL
Johnson TX
Capuano MA
Jones OH
Doggett TX
Stark CA
Dicks WA
Dooley CA
Kind WI
Skelton MO
Davis FL
Kennedy RI
Alexander LA
Kucinich OH
Carson IN
Bell TX
Baca CA
Boucher VA
Pelosi CA
Moore KS
Hoyer MD
Oberstar MN
Carson OK
Peterson MN
Van Hollen MD
Langevin RI
Brown OH
Watson CA
Berman CA
Reyes TX
Pomeroy ND
Cramer AL
Gutierrez IL
Waxman CA
Thompson MS
Frost TX
Holden PA
Stenholm TX
Velazquez NY
Rodriguez TX
Lofgren CA
Case HI
Lantos CA
Allen ME
Roybal-Allard CA
Nadler NY
Taylor MS
Menendez NJ
Clay MO
Hooley OR
Davis IL
Hinojosa TX
Jackson IL
Scott VA
Sherman CA
Owens NY
Meeks NY
Thompson CA
Gonzalez TX
Woolsey CA
John LA
Snyder AR
Udall CO
Ford TN
Schiff CA
Harman CA
Smith WA
Kildee MI
Schakowsky IL
Strickland OH
Ruppersberger MD
Spratt SC
Hinchey NY
Hoeffel PA
Boswell IA
Lewis GA
McIntyre NC
Millender-McDonald CA
McDermott WA
Brown FL
Berry AR
Napolitano CA
Inslee WA
Weiner NY
Sabo MN
Pastor AZ
Sanchez CA
Engel NY
Larsen WA
Solis CA
Price NC
Wexler FL
Costello IL
Boyd FL
Baldwin WI
Lee CA
Clyburn SC
Rangel NY
Udall NM
Sandlin TX
Obey WI
Markey MA
Ross AR
Majette GA
Filner CA
Evans IL
Dingell MI
Rohrabacher CA
Jones NC
Weldon FL
Smith NJ
Gillmor OH
Lucas OK
Petri WI
Burton IN
Miller MI
Young FL
Biggert IL
McCrery LA
McInnis CO
Chocola IN
Norwood GA
Brown SC
Ramstad MN
Musgrave CO
Gilchrest MD
Deal GA
Brady TX
Rogers MI
Walsh NY
Issa CA
Harris FL
Davis VA
Linder GA
Chabot OH
Shadegg AZ
Johnson CT
Lewis KY
Herger CA
Cox CA
Camp MI
Emerson MO
Taylor NC
Akin MO
Pearce NM
Otter ID
Granger TX
Coble NC
Kline MN
Shuster PA
Boehlert NY
Davis VA
LoBiondo NJ
Miller FL
Nunes CA
Ehlers MI
Simpson ID
Feeney FL
Bonilla TX
Sessions TX
Blunt MO
Sensenbrenner WI
Kennedy MN
McHugh NY
Sherwood PA
King IA
Nussle IA
Wilson SC
Simmons CT
Brown-Waite FL
Hulshof MO
Burr NC
Sweeney NY
Bachus AL
Boozman AR
Johnson IL
Burns GA
Northup KY
Vitter LA
Pitts PA
Pryce OH
Terry NE
Barrett SC
Quinn NY
Leach IA
Thomas CA
King NY
Putnam FL
Hoekstra MI
Pickering MS
Pombo CA
Bishop UT
Saxton NJ
Cannon UT
Wicker MS
Ney OH
Bradley NH
Crenshaw FL
Jenkins TN
Bereuter NE
Gallegly CA
Everett AL
Calvert CA
Gibbons NV
Istook OK
Gerlach PA
Hyde IL
Hunter CA
Capito WV
Paul TX
Duncan TN
Whitfield KY
Flake AZ
Hall TX
Renzi AZ
Smith TX
Sullivan OK
Ose CA
Gutknecht MN
Isakson GA
Porter NV
Turner OH
Beauprez CO
Stearns FL
Walden OR
Ballenger NC
Houghton NY
Bilirakis FL
DeLay TX
Franks AZ
Hayworth AZ
Cantor VA
Castle DE
Dreier CA
Lewis CA
Buyer IN
Doolittle CA
Upton MI
DeMint SC
Knollenberg MI
Goodlatte VA
Thornberry TX
Carter TX
Diaz-Balart FL
Bonner AL
Osborne NE
Wilson NM
Ryan WI
Murphy PA
Shays CT
Tiahrt KS
Garrett NJ
Moran KS
Bartlett MD
Pence IN
Forbes VA
Foley FL
Baker LA
Kelly NY
Boehner OH
Myrick NC
Wolf VA
Graves MO
Neugebauer TX
Weller IL
Goss FL
Crane IL
McCotter MI
Greenwood PA
Gingrey GA
Hostettler IN
Latham IA
Fossella NY
Hensarling TX
Green WI
Blackburn TN
Royce CA
Diaz-Balart FL
Tancredo CO
Rehberg MT
Johnson TX
Culberson TX
Tiberi OH
Schrock VA
Kirk IL
Cunningham CA
Rogers KY
Hart PA
Ryun KS
LaHood IL
Cole OK
Burgess TX
Aderholt AL
Peterson PA
Shaw FL
Miller CA
Wamp TN
Nethercutt WA
Collins GA
Platts PA
Bass NH
Manzullo IL
Dunn WA
Hefley CO
Hobson OH
Smith MI
Kolbe AZ
Barton TX
Mica FL
Regula OH
Ferguson NJ
Toomey PA
English PA
Hayes NC
Radanovich CA
Mack CA
Reynolds NY
Goode VA
Cubin WY
Young AK
Ros-Lehtinen FL
LaTourette OH
Hastings WA
Kingston GA
Keller FL
Shimkus IL
Portman OH
Souder IN
Oxley OH



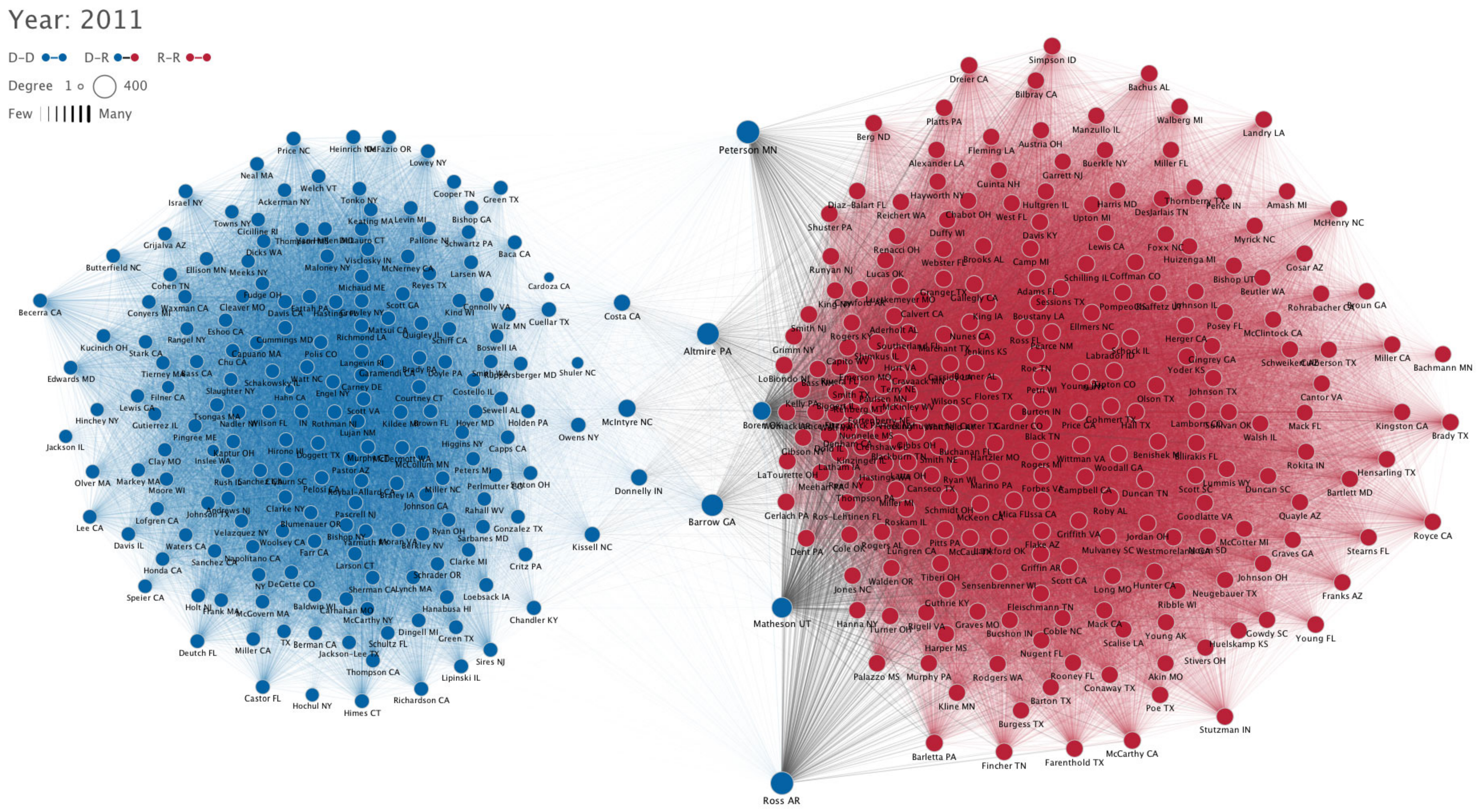
Year: 2005
D–D
D–R
R–R
Degree 1
400
Few
Many
Boren OK
Cramer AL
Paul TX
DeLay TX
Regula OH
Hobson OH
Smith TX
Northup KY
Wilson NM
Granger TX
Simpson ID
Pitts PA
Wilson SC
Oxley OH
Harris FL
Shays CT
Reichert WA
Jones NC
Peterson PA
Murtha PA
Taylor MS
Matheson UT
Cuellar TX
Reyes TX
Stark CA
Waters CA
McKinney GA
Israel NY
Thompson CA
Blumenauer OR
Skelton MO
DeLauro CT



Year: 2007
D–D
D–R
R–R
Degree 1
400
Few
Many
Woolsey CA
Brady PA
Tanner TN
Payne NJ
Cooper TN
Pomeroy ND
Price NC
Mahoney FL
Hooley OR
Miller CA
Inslee WA
Rahall WV
Boren OK
Donnelly IN
Larsen WA
Green TX
Lofgren CA
Jefferson LA
Loebsack IA
Gordon TN
Kaptur OH
Wynn MD
Holt NJ
Slaughter NY
Lowey NY
Pallone NJ
Sanchez CA
Sires NJ
Baca CA
Jones OH
Bishop GA
Gillibrand NY
Jackson IL
Pascrell NJ
Fattah PA
Hinojosa TX
Clarke NY
Peterson MN
Davis TN
Lampson TX
Mitchell AZ
Harman CA
Shuler NC
Capps CA
Clyburn SC
Klein FL
Walz MN
Barrow GA
Brown FL
Giffords AZ
Altmire PA
Paul TX
Smith NJ
Peterson PA
Ehlers MI
Campbell CA
Gilchrest MD
Regula OH
Renzi AZ
Kirk IL
LaHood IL
Hulshof MO
LoBiondo NJ
Ferguson NJ
Pearce NM
Bachmann MN
Knollenberg MI
Blunt MO
Smith TX
Shadegg AZ
Burton IN
Lewis CA
Burgess TX
Mica FL
Cannon UT
Dent PA
Capito WV
Neugebauer TX
Pitts PA
Rodgers WA
Linger GA
Foxx NC
Weller IL
Herger CA
Murphy PA
Barton TX
Hunter CA
Everett AL
Pence IN
Sessions TX
Feeney FL
Johnson IL
Buyer IN
Flake AZ



Year: 2009
D–D
D–R
R–R
Degree 1
400
Few
Many
Davis TN
Kilroy OH
Murphy NY
Arcuri NY
Cleaver MO
Cardoza CA
Kissell NC
Davis AL
Lowey NY
Carson IN
Stupak MI
Boyd FL
Price NC
Clyburn SC
Tonko NY
McNerney CA
Space OH
Tierney MA
Jackson-Lee TX
Sires NJ
Berkley NV
Rodriguez TX
DeLauro CT
Costello IL
Kanjorski PA
Shuler NC
Sandlin SD
Shea-Porter NH
Carney PA
Hinchey NY
Schultz FL
Berman CA
Gonzalez TX
Farr CA
Roybal-Allard CA
Pomeroy ND
Markey CO
Nadler NY
Baca CA
Becerra CA
Andrews NJ
Waxman CA
Reyes TX
McCollum MN
Carnahan MO
Levin MI
Adler NJ
McIntyre NC
Mollohan WV
Miller NC
Dahlkemper PA
Blumenauer OR
Clarke NY
Higgins NY
Pastor AZ
Cummings MD
Baldwin WI
Meek FL
Green TX
Capps CA
Himes CT
Filner CA
Neal MA
Klein FL
Sherman CA
Giffords AZ
Smith WA
Olver MA
Serrano NY
Schiff CA
Cuellar TX
Ellsworth IN
McDermott WA
Connolly VA
Brown FL
Johnson TX
Miller CA
Ruppersberger MD
Loebsack IA
Heinrich NM
Stark CA
Meeks NY
Rangel NY
Ryan OH
Gordon TN
McMahon NY
Altmire PA
Obey WI
Richardson CA
Doggett TX
Napolitano CA
Polis CO
Schauer MI
Driehaus OH
Larson CT
Delahunt MA
Fattah PA
Schakowsky IL
Yarmuth KY
Moore KS
Ross AR
McGovern MA
Velazquez NY
Boucher VA
Perlmutter CO
DeGette CO
Dingell MI
Visclosky IN
Barrow GA
Gutierrez IL
Speier CA
Welch VT
Pingree ME
Brady PA
Frank MA
Eshoo CA
Davis CA
Peters MI
Watt NC
Jackson IL
Langevin RI
Baird WA
Teague NM
Maloney NY
Kagen WI
Kucinich OH
Boccieri OH
Conyers MI
Towns NY
Quigley IL
Costa CA
Bishop GA
Walz MN
Kosmas FL
Butterfield NC
Castor FL
Dicks WA
Kaptur OH
Matheson UT
Markey MA
Weiner NY
Sanchez CA
Waters CA
Hall NY
Murphy PA
Inslee WA
Edwards TX
Johnson GA
DeFazio OR
Grayson FL
Cohen TN
Foster IL
Sestak PA
Scott VA
Ortiz TX
Murphy CT
Rahall WV
Grijalva AZ
Rush IL
Hastings FL
Pascrell NJ
Skelton MO
Wilson OH
Bishop NY
Ellison MN
Hoyer MD
Larsen WA
Engel NY
Kennedy RI
Capuano MA
Moran VA
Honda CA
Thompson MS
Berry AR
Van Hollen MD
Salazar CO
Marshall GA
Payne NJ
Fudge OH
Tsongas MA
Lee CA
Michaud ME
Sarbanes MD
Rothman NJ
Lewis GA
Harman CA
Edwards MD
Spratt SC
Maffei NY
Kirkpatrick AZ
Slaughter NY
Watson CA
Hirono HI
Snyder AR
Courtney CT
Lipinski IL
Davis IL
Kilpatrick MI
Holt NJ
Titus NV
Crowley NY
Matsui CA
Moore WI
Schrader OR
Doyle PA
Thompson CA
Boren OK
Hill IN
McCarthy NY
Hodes NH
Woolsey CA
Boswell IA
Etheridge NC
Hare IL
Halvorson IL
Clay MO
Braley IA
Chandler KY
Perriello VA
Sanchez CA
Ackerman NY
Wu OR
Oberstar MN
Sutton OH
Pallone NJ
Scott GA
Lofgren CA
Hinojosa TX
Israel NY
Bean IL
Green TX
Kildee MI
Lynch MA
Schwartz PA
Melancon LA
Holden PA
Peterson MN
Tanner TN
Cooper TN
Kind WI
Lujan NM
Taylor MS
Nye VA
Kratovil MD
Childers MS
Donnelly IN
Minnick ID
Mitchell AZ
Griffith AL
Hoekstra MI
Bright AL
Cao LA
Smith NJ
Goodlatte VA
Frelinghuysen NJ
Luetkemeyer MO
Latta OH
Dreier CA
Bartlett MD
Buchanan FL
Miller FL
Thompson PA
Hunter CA
Young FL
King NY
Lewis CA
Hastings WA
Brady TX
Issa CA
Fortenberry NE
Cole OK
Kline MN
Gingrey GA
Mica FL
Sensenbrenner WI
Rodgers WA
Emerson MO
Wilson SC
Lance NJ
Austria OH
Ryan WI
Franks AZ
Miller MI
Radanovich CA
Pitts PA
Herger CA
Akin MO
Calvert CA
Davis KY
Bilbray CA
Blackburn TN
Neugebauer TX
Fallin OK
Fleming LA
Brown-Waite FL
Putnam FL
Westmoreland GA
Platts PA
Smith NE
Jenkins KS
Boozman AR
Thornberry TX
LaTourette OH
Foxx NC
Latham IA
Roe TN
Bonner AL
Coffman CO
Burton IN
Poe TX
Inglis SC
Buyer IN
Lee NY
Capito WV
Walden OR
Manzullo IL
McKeon CA
Mack FL
Lamborn CO
Boehner OH
Camp MI
Bilirakis FL
Shuster PA
Blunt MO
Flake AZ
Whitfield KY
McCarthy CA
Wittman VA
Paulsen MN
Harper MS
Kingston GA
Guthrie KY
Stearns FL
Jordan OH
Broun GA
Dent PA
Royce CA
Carter TX
Ros-Lehtinen FL
Smith TX
Scalise LA
Barton TX
Roskam IL
King IA
Shadegg AZ
Gohmert TX
Heller NV
Lummis WY
Olson TX
Linder GA
Castle DE
Hall TX
Schmidt OH
McHenry NC
Johnson TX
Forbes VA
Conaway TX
Garrett NJ
Campbell CA
Tiberi OH
Myrick NC
Young AK
Rehberg MT
Coble NC
Mack FL
Tiahrt KS
Nunes CA
Chaffetz UT
Rooney FL
Duncan TN
Posey FL
Graves MO
Jones NC
McCotter MI
McCaul TX
Gallegly CA
Cantor VA
Sullivan OK
Miller CA
Diaz-Balart FL
Crenshaw FL
Pence IN
Rogers MI
Bachus AL
Granger TX
Marchant TX
Biggert IL
Schock IL
Hensarling TX
Simpson ID
Lungren CA
Burgess TX
McClintock CA
Turner OH
Gerlach PA
Bachmann MN
Rohrabacher CA
LoBiondo NJ
Cassidy LA
Price GA
Lucas OK
Boustany LA
Moran KS
Sessions TX
Murphy PA
Reichert WA
Shimkus IL
Johnson IL
Culberson TX
Diaz-Balart FL
Rogers AL
Aderholt AL
Bishop UT
Ehlers MI
Petri WI
Wolf VA
Rogers KY
Brown SC
Terry NE
Upton MI
Alexander LA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D–R
R–R
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Few
Many
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Altmire PA
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McIntyre NC
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Barrow GA
Kissell NC
Matheson UT
Ross AR
Owens NY
Shuler NC
Cardoza CA
Cuellar TX
Chandler KY
Critz PA
Becerra CA
Kucinich OH
Edwards MD
Hinchey NY
Jackson IL
Olver MA
Lee CA
Davis IL
Speier CA
Deutch FL
Castor FL
Hochul NY
Himes CT
Richardson CA
Lipinski IL
Sires NJ
Thompson CA
Price NC
Heinrich NM
DeFazio OR
Lowey NY
Neal MA
Israel NY
Grijalva AZ
Butterfield NC
Cooper TN
Green TX
Baca CA
Simpson ID
Dreier CA
Bilbray CA
Bachus AL
Platts PA
Berg ND
Manzullo IL
Walberg MI
Landry LA
Amash MI
McHenry NC
Myrick NC
Gosar AZ
Broun GA
Miller CA
Bachmann MN
Brady TX
Kingston GA
Hensarling TX
Bartlett MD
Royce CA
Stearns FL
Franks AZ
Young FL
Gowdy SC
Huelskamp KS
Stivers OH
Stutzman IN
McCarthy CA
Farenthold TX
Fincher TN
Barletta PA
Burgess TX
Kline MN
Palazzo MS
Murphy PA
Poe TX
Akin MO
Conaway TX

Part Two

What are social networks?

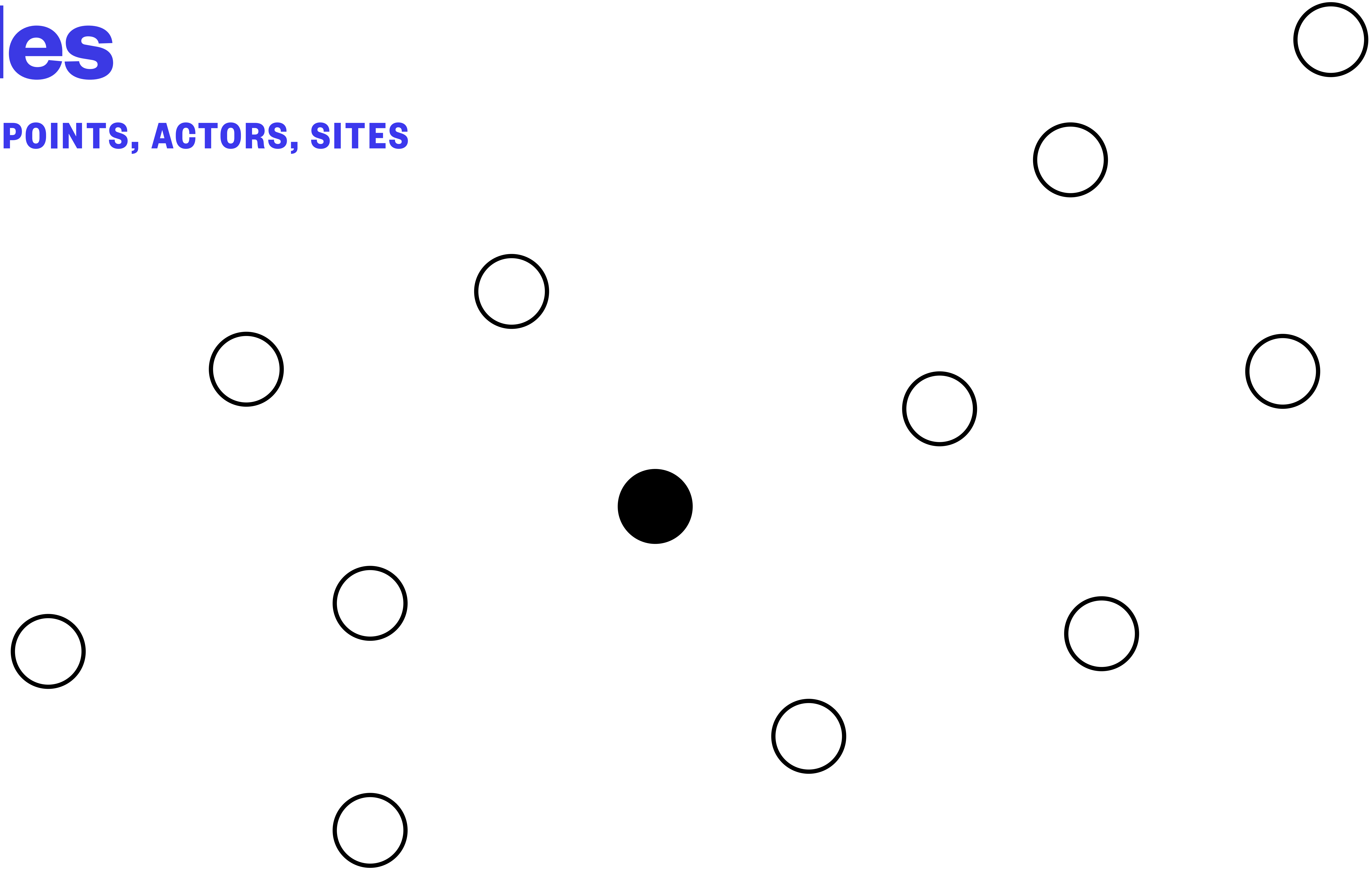
Networks have two basic elements:

Nodes & Edges

- Let’s take an imaginary ego-centric friendship network to illustrate
  - Ego-centric: A network focused on a particular individual

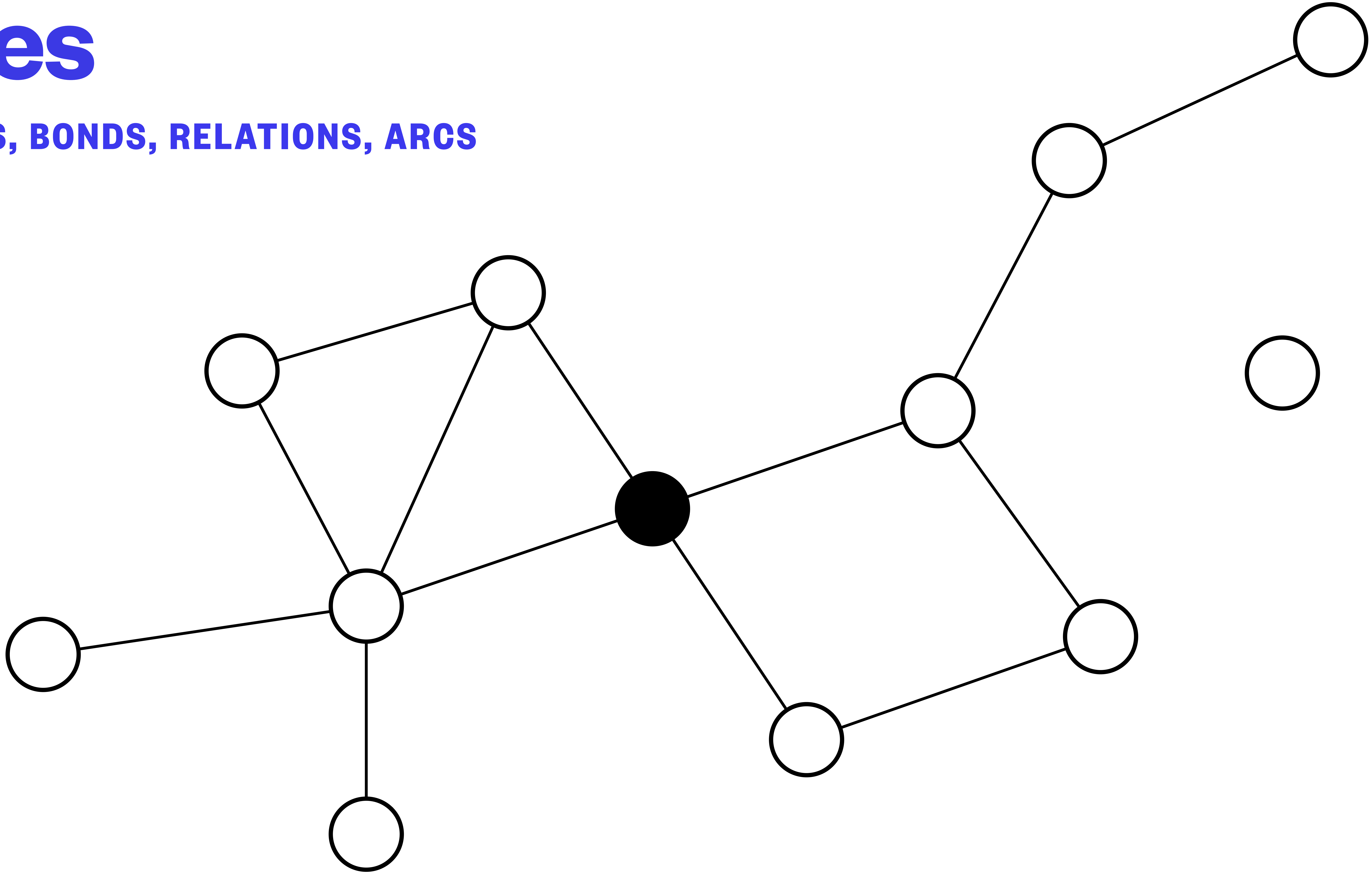
Nodes

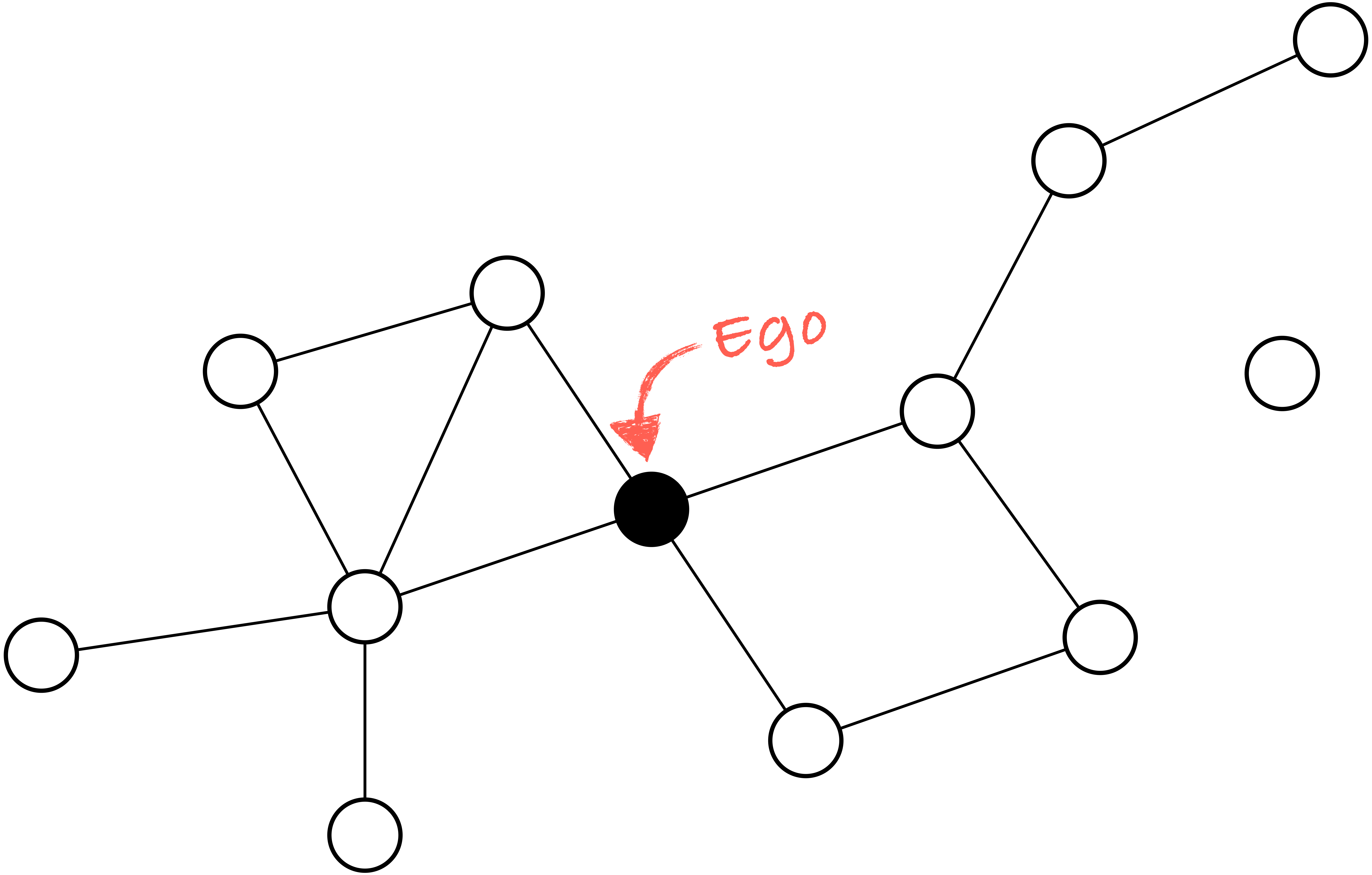
VERTICES, POINTS, ACTORS, SITES

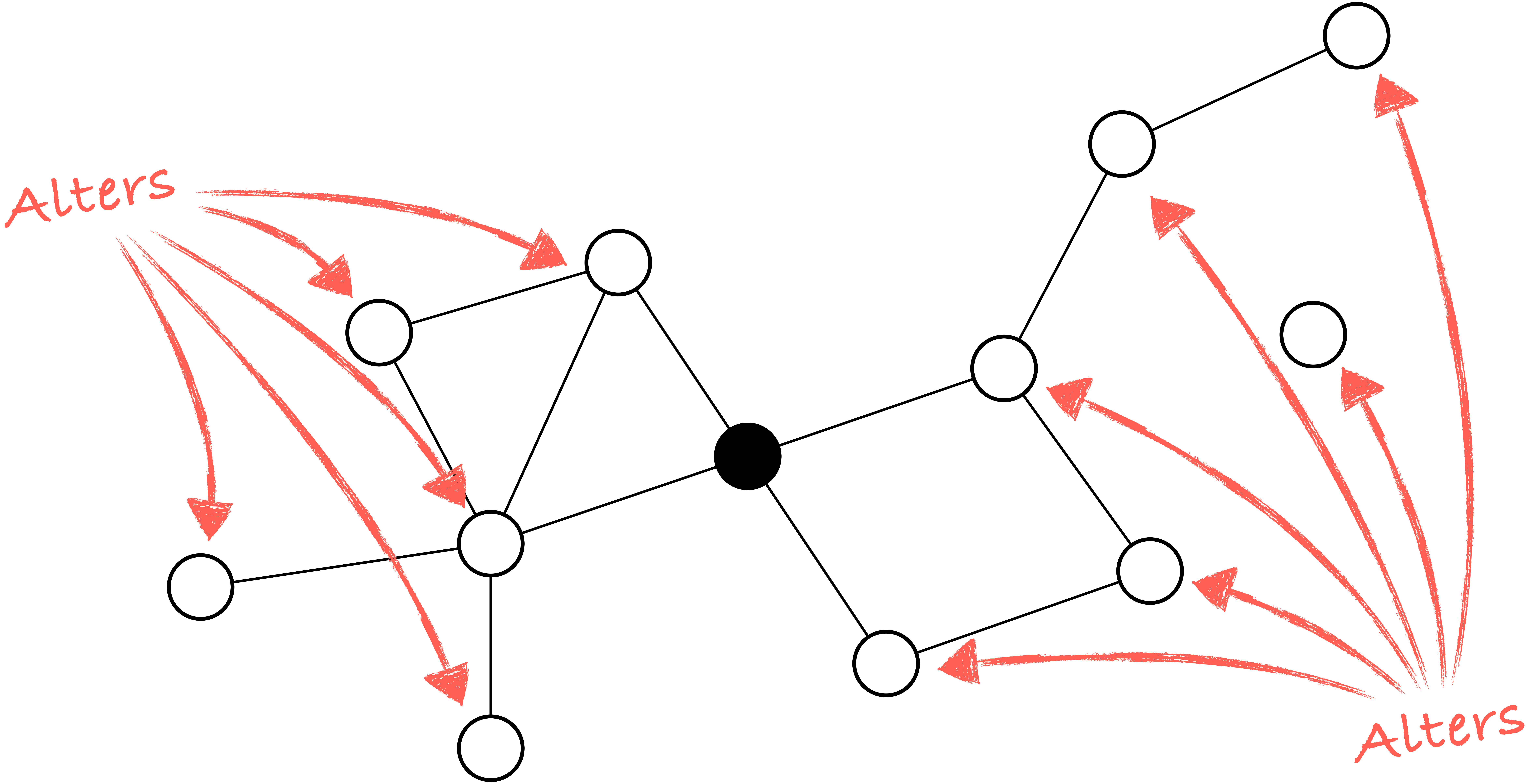


Edges

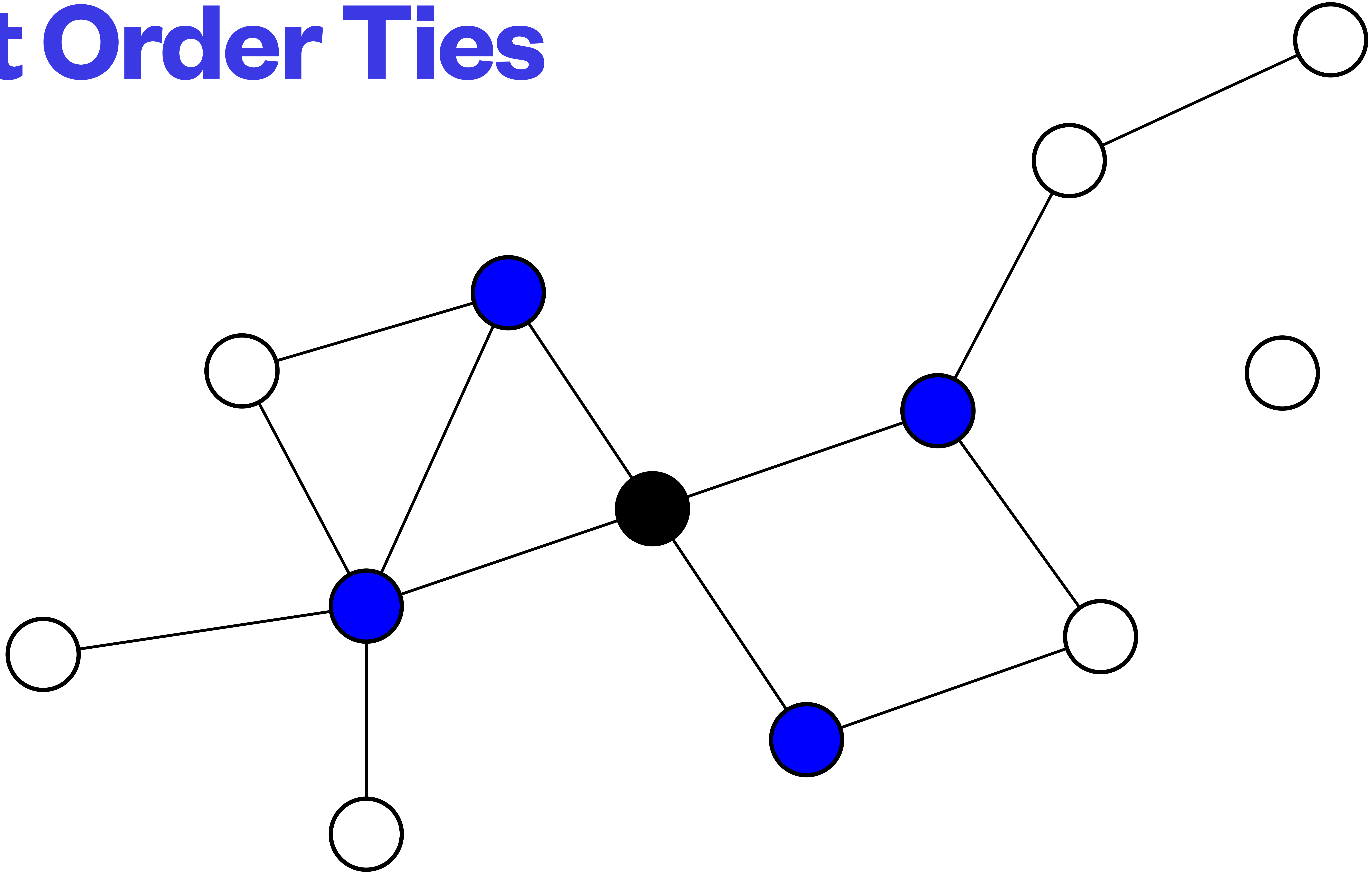
TIES, LINKS, BONDS, RELATIONS, ARCS



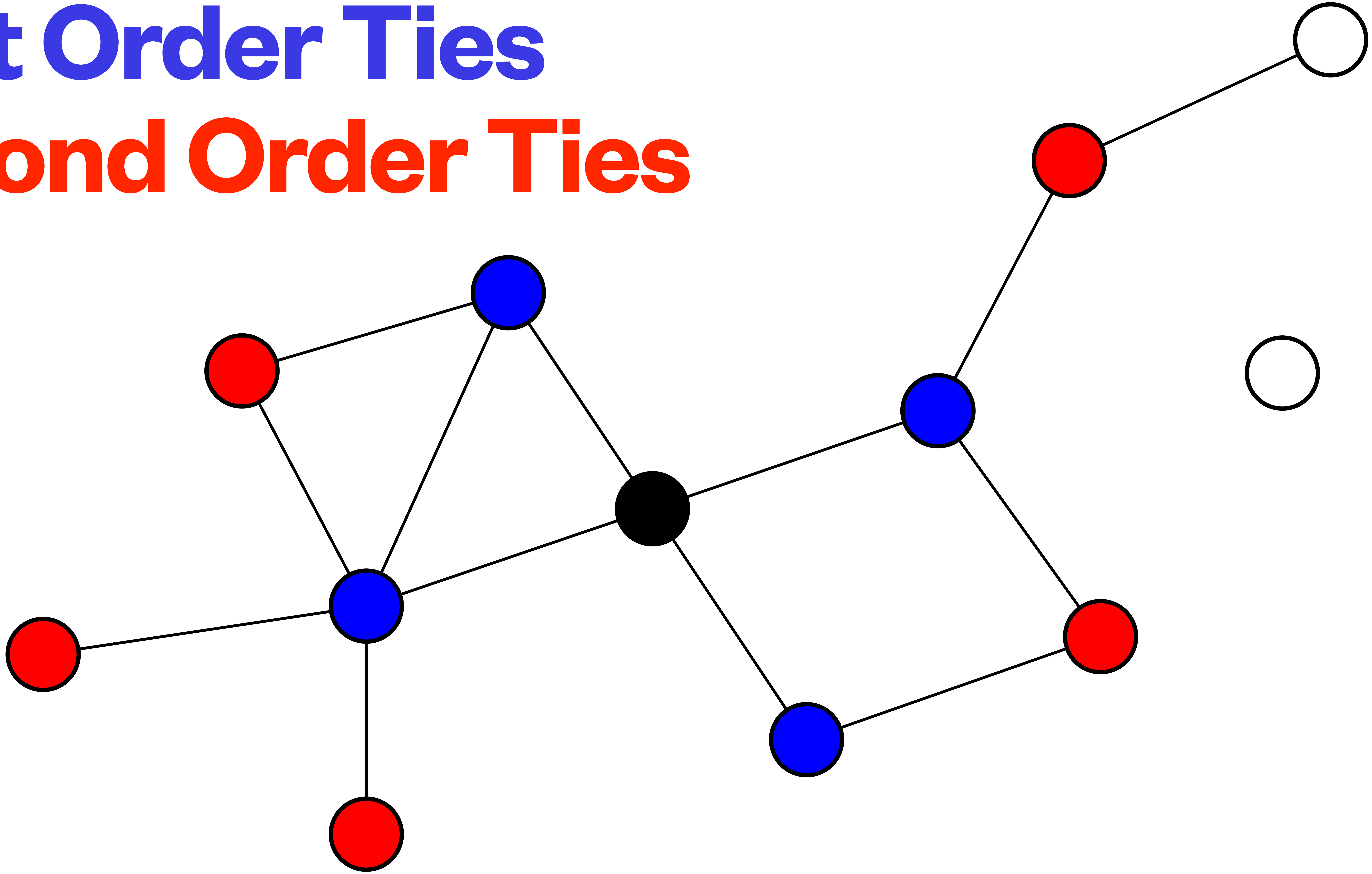

Ego


Alters
Alters

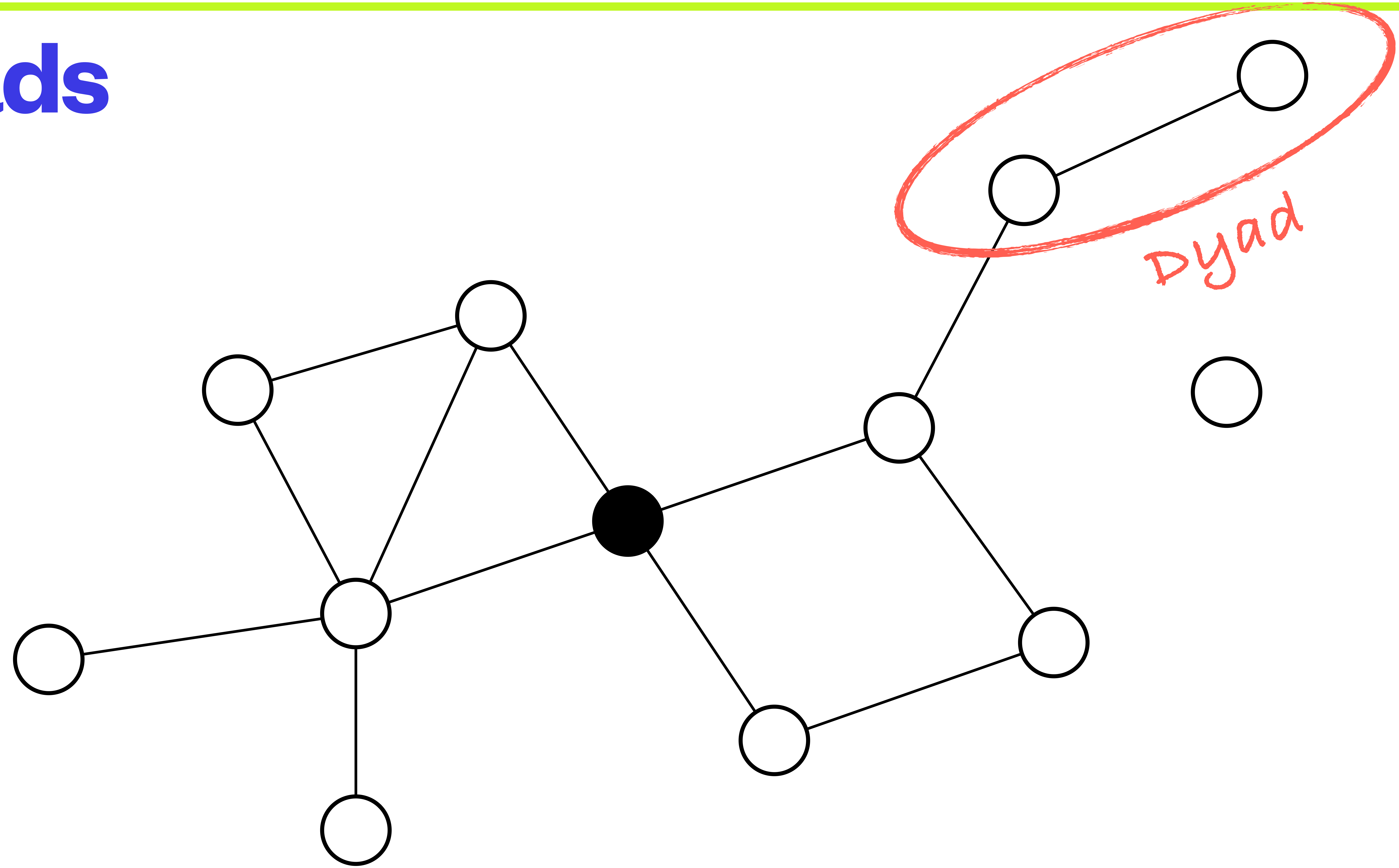
First Order Ties



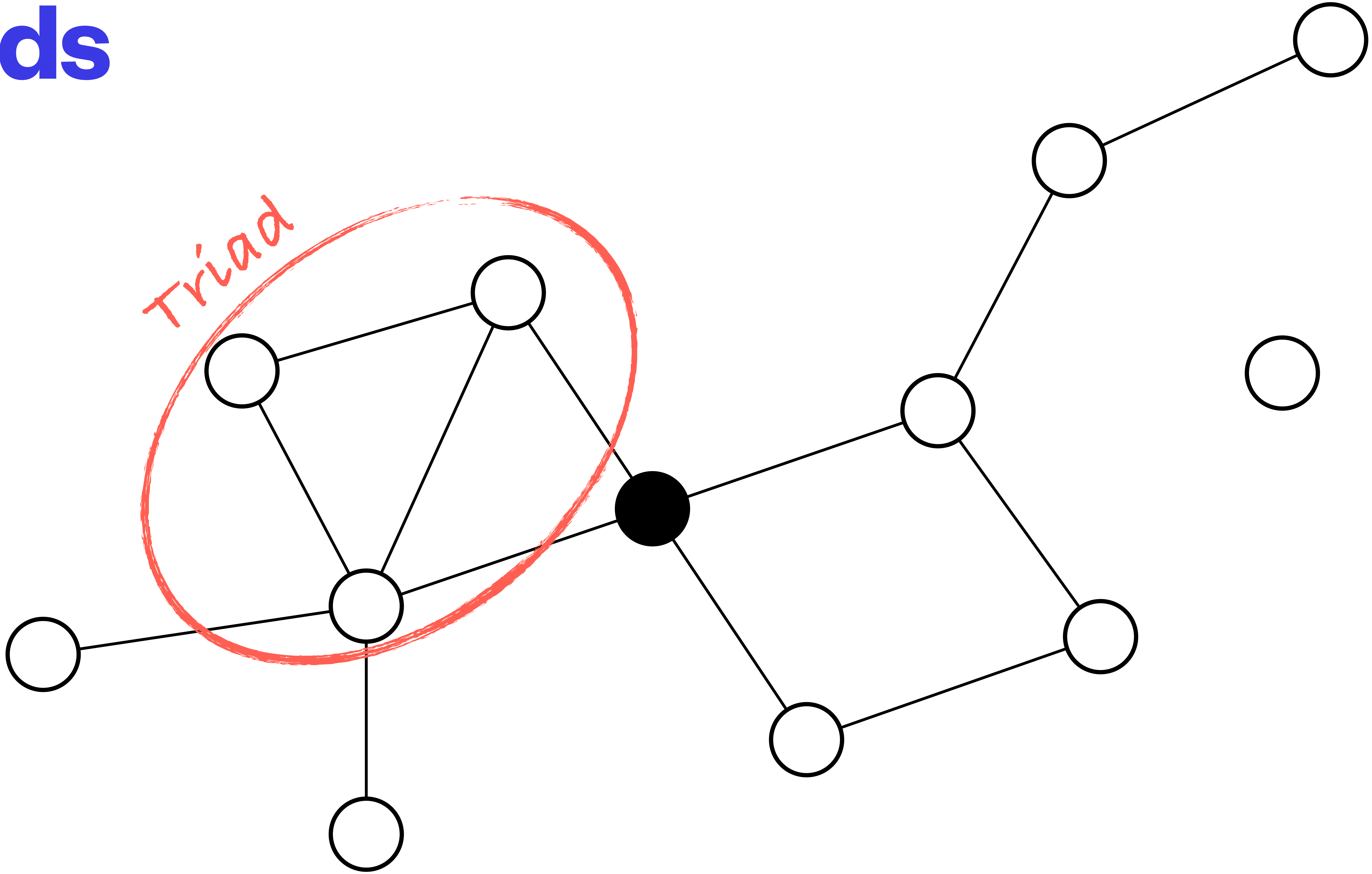
First Order Ties
Second Order Ties



Dyads

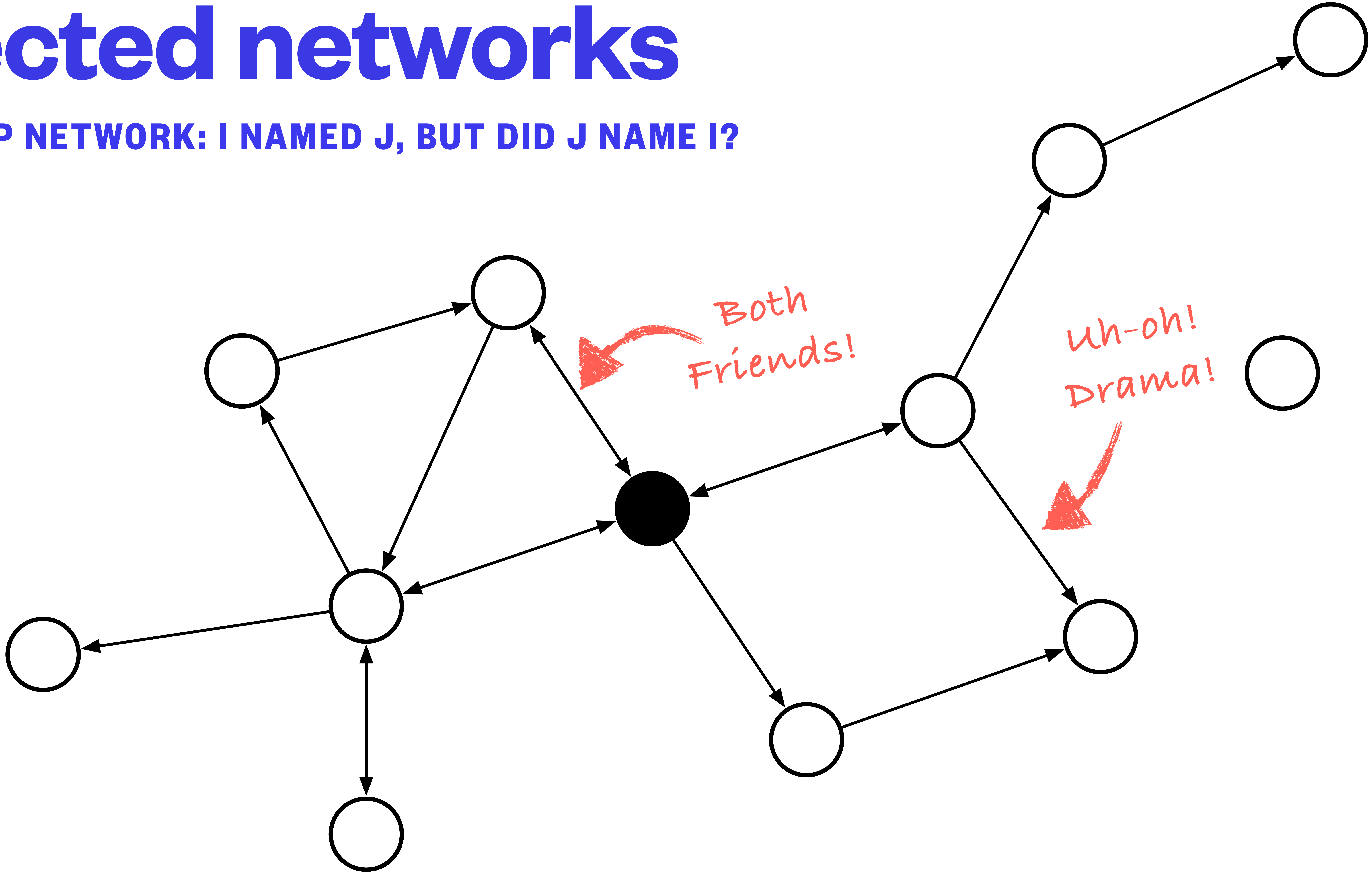


Triads



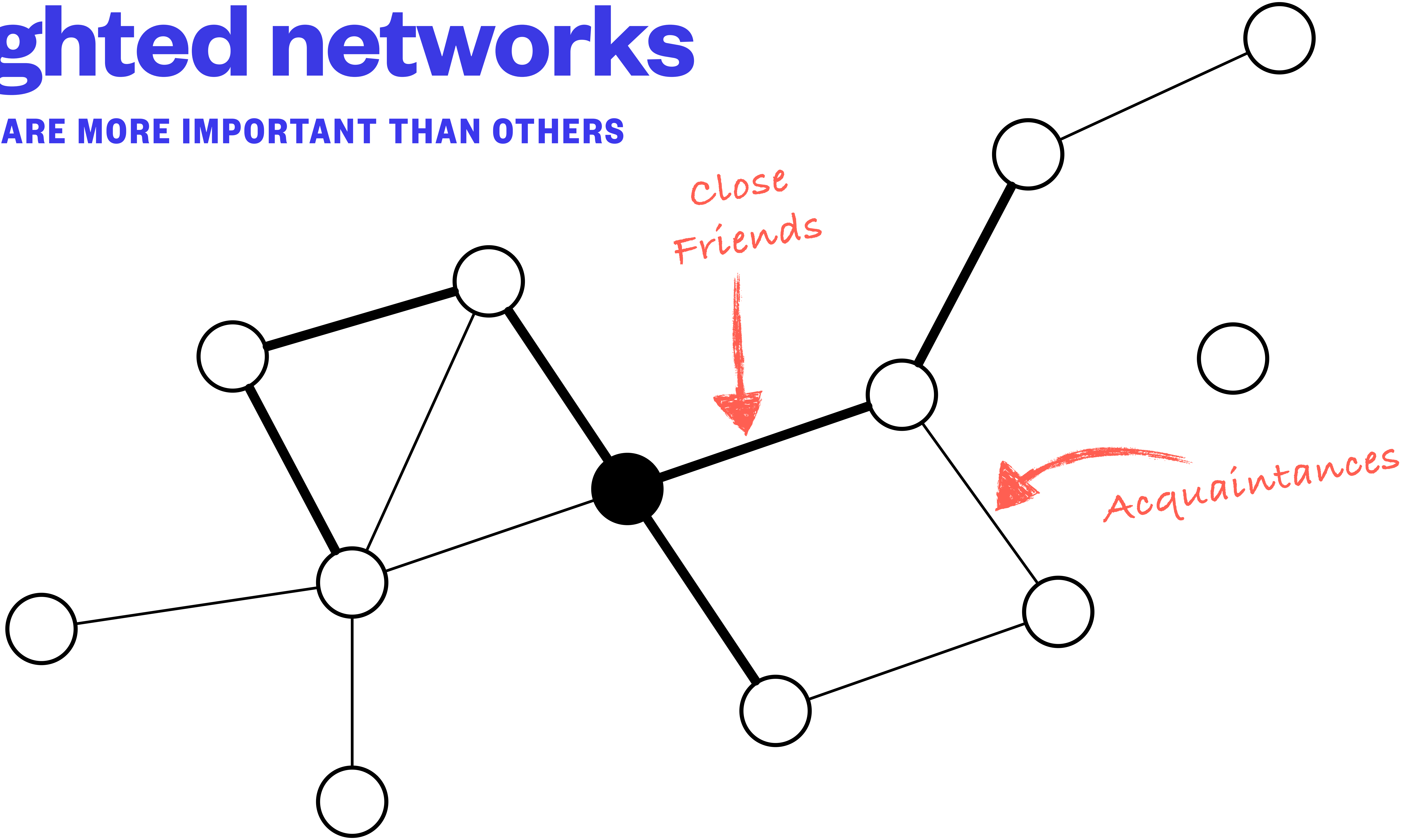
Directed networks

FRIENDSHIP NETWORK: I NAMED J, BUT DID J NAME I?



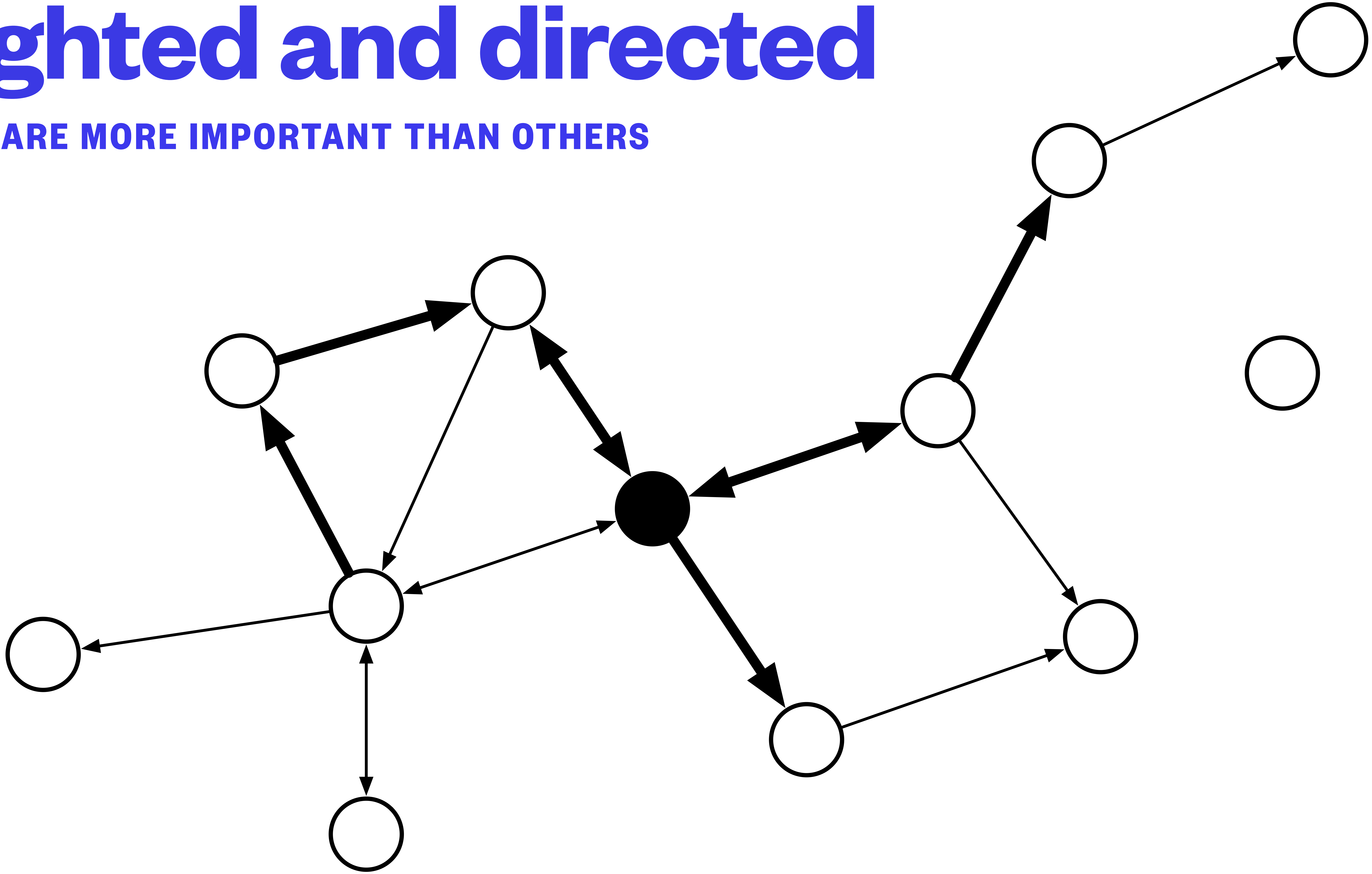
Weighted networks

SOME TIES ARE MORE IMPORTANT THAN OTHERS



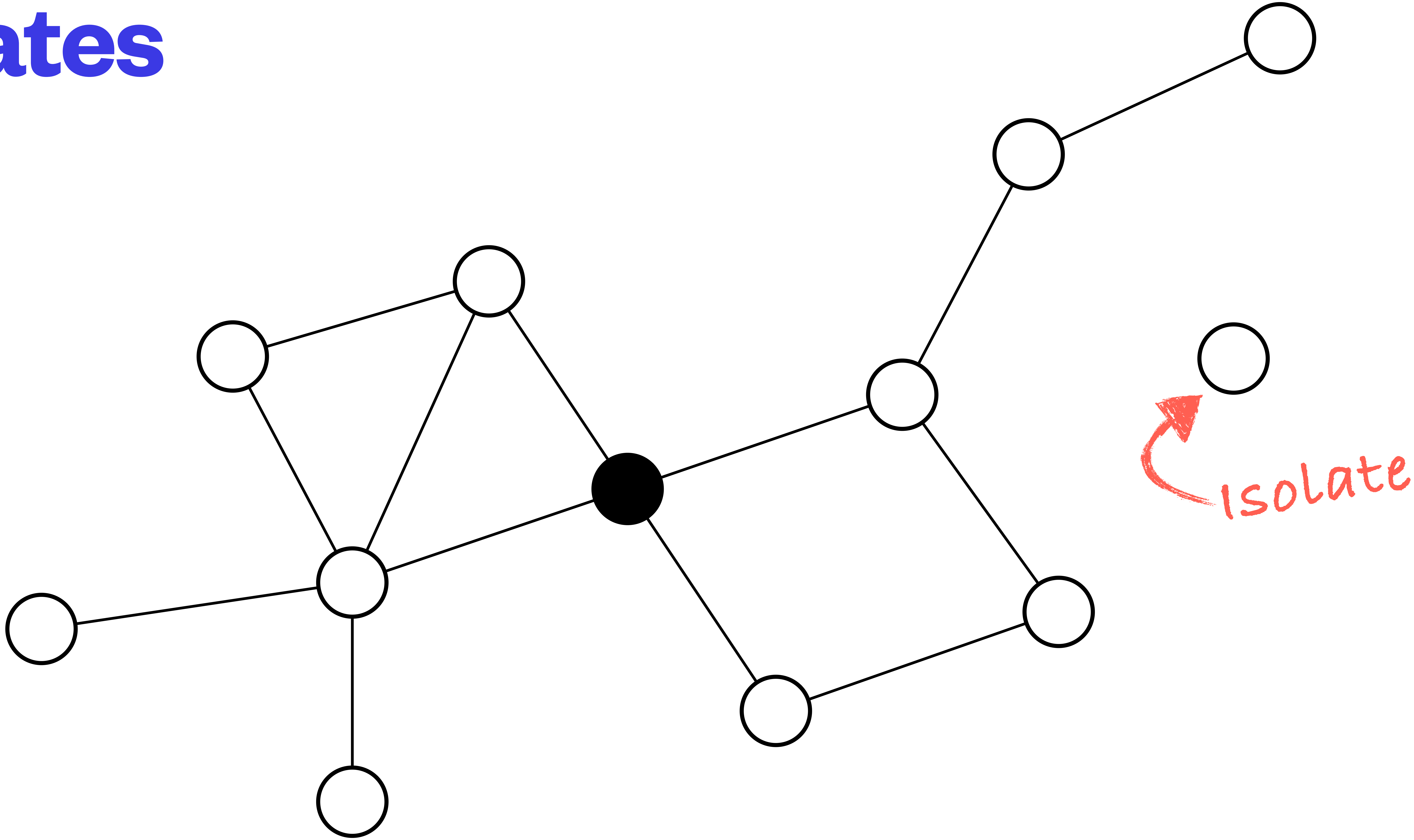
Weighted and directed

SOME TIES ARE MORE IMPORTANT THAN OTHERS

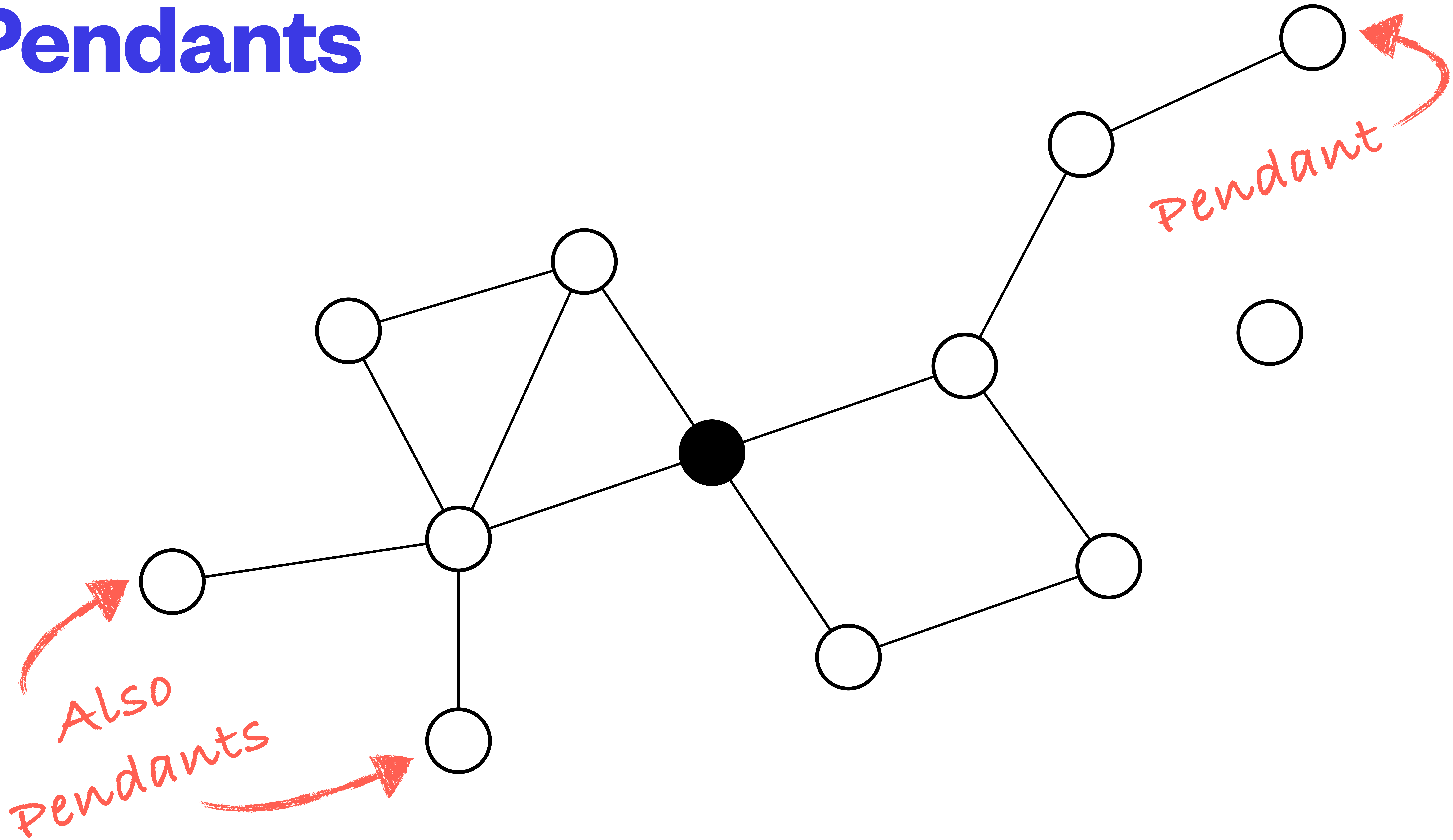


Describing Parts of Networks

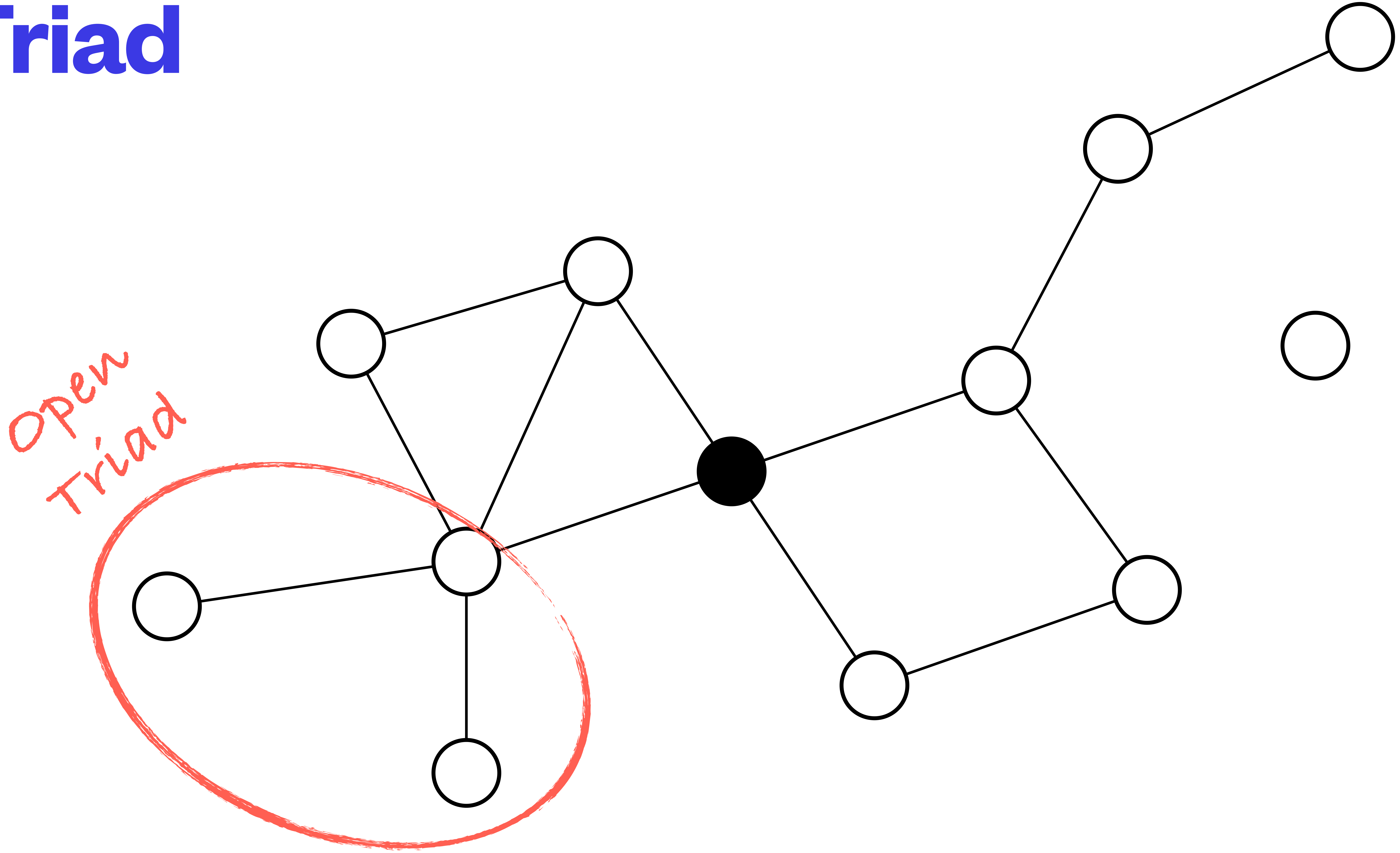
Isolates



Pendants

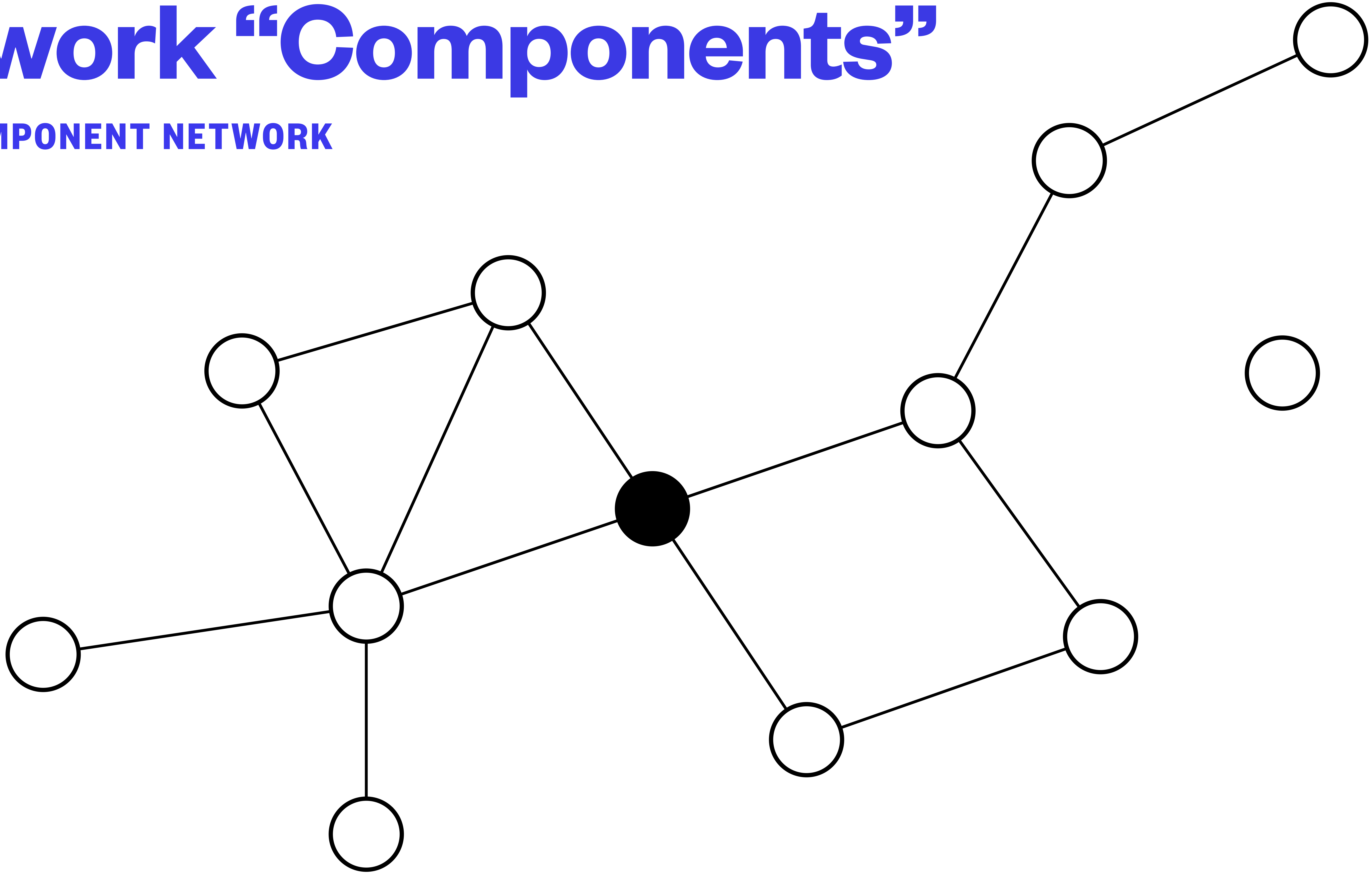


Triad



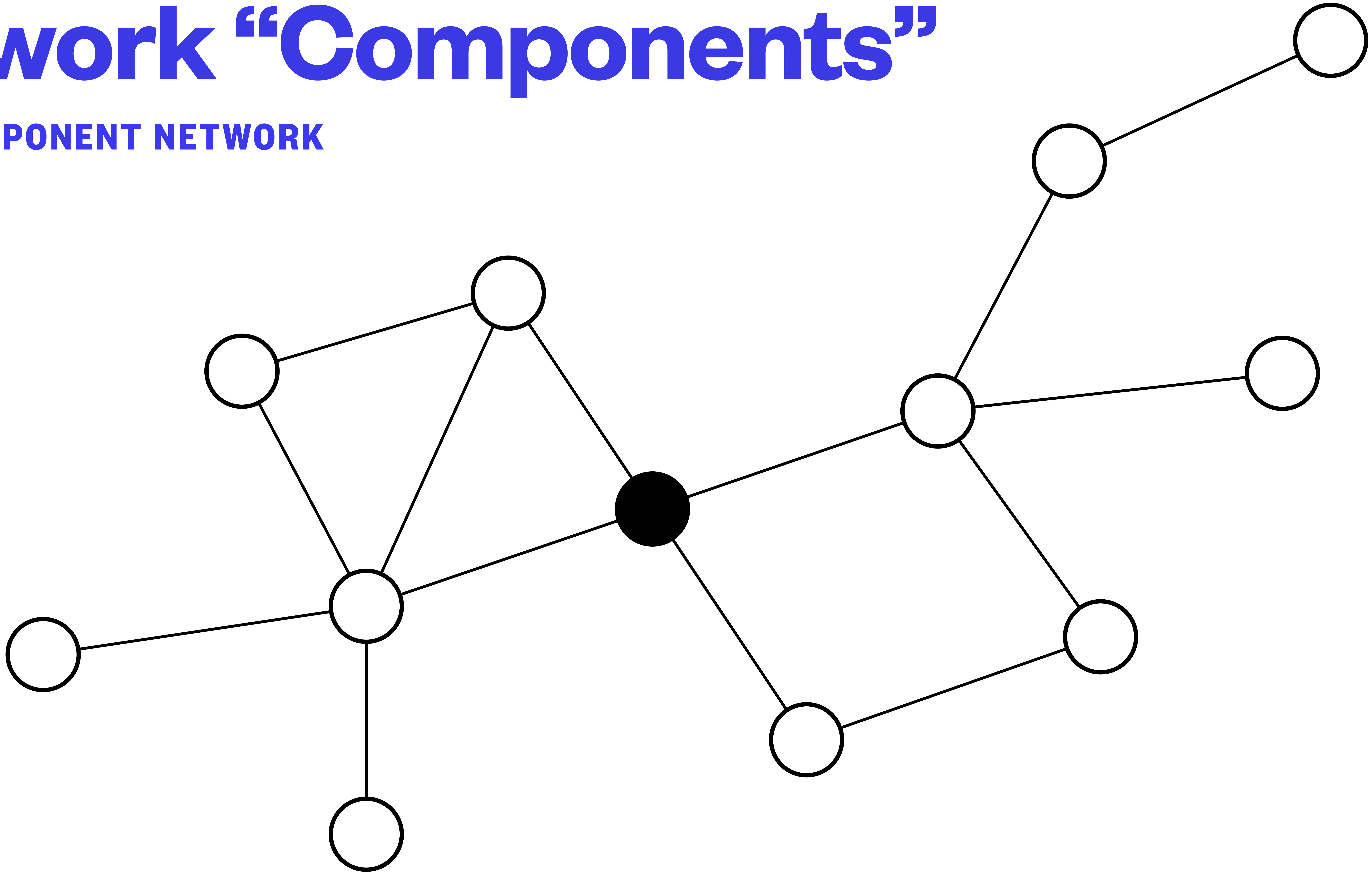
Network “Components”

A TWO-COMPONENT NETWORK



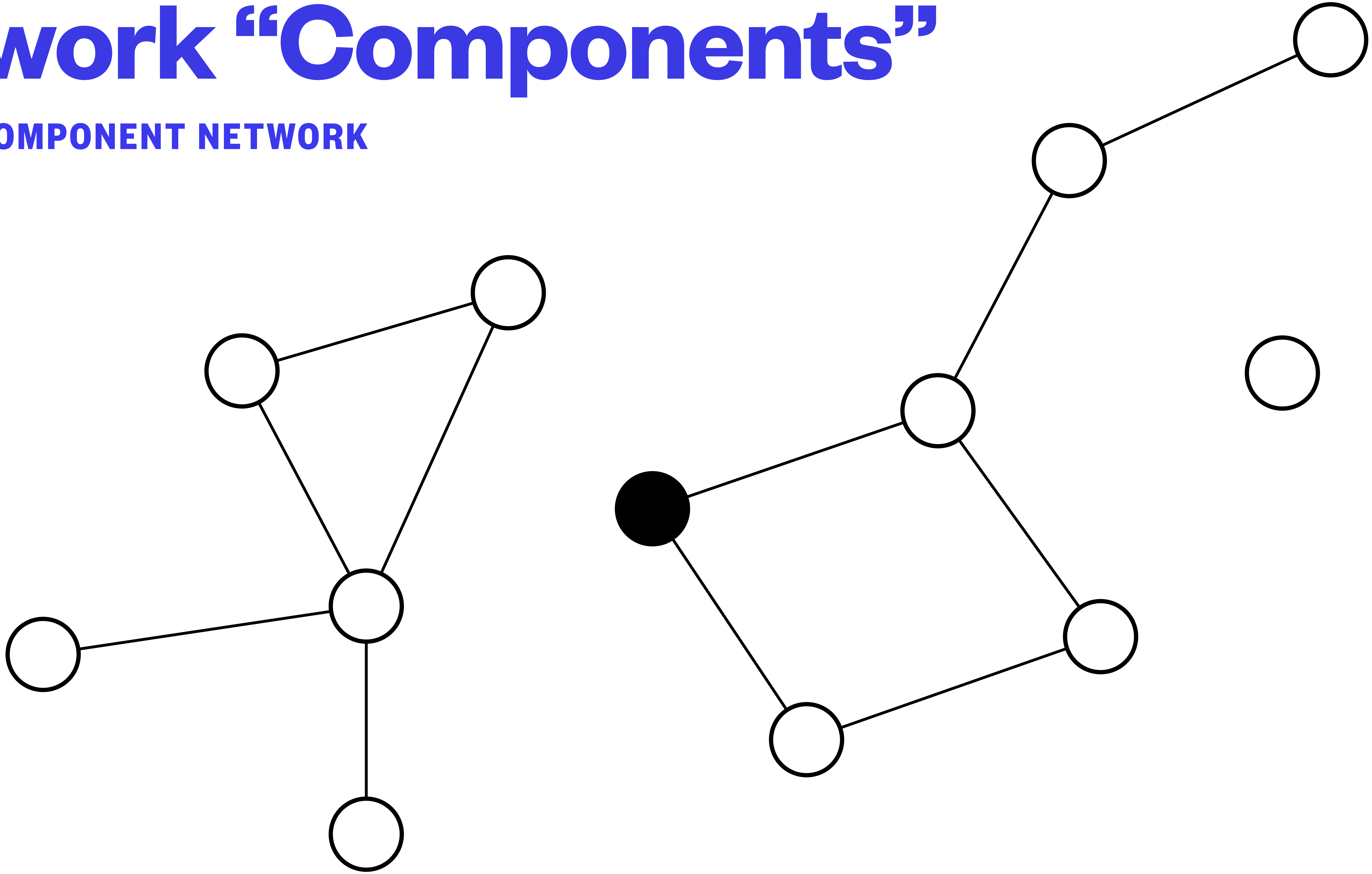
Network “Components”

A ONE-COMPONENT NETWORK



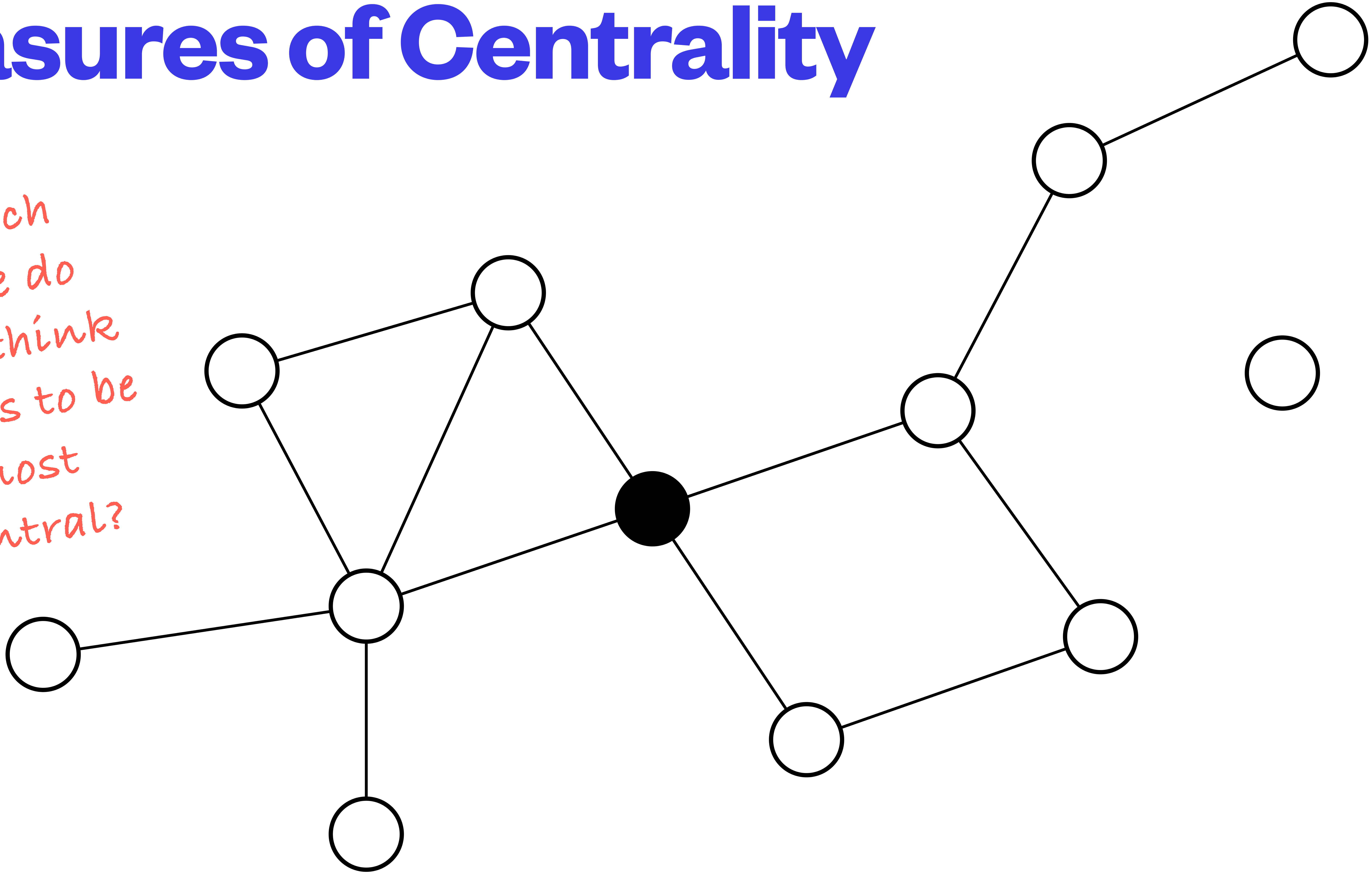
Network "Components"

A THREE-COMPONENT NETWORK



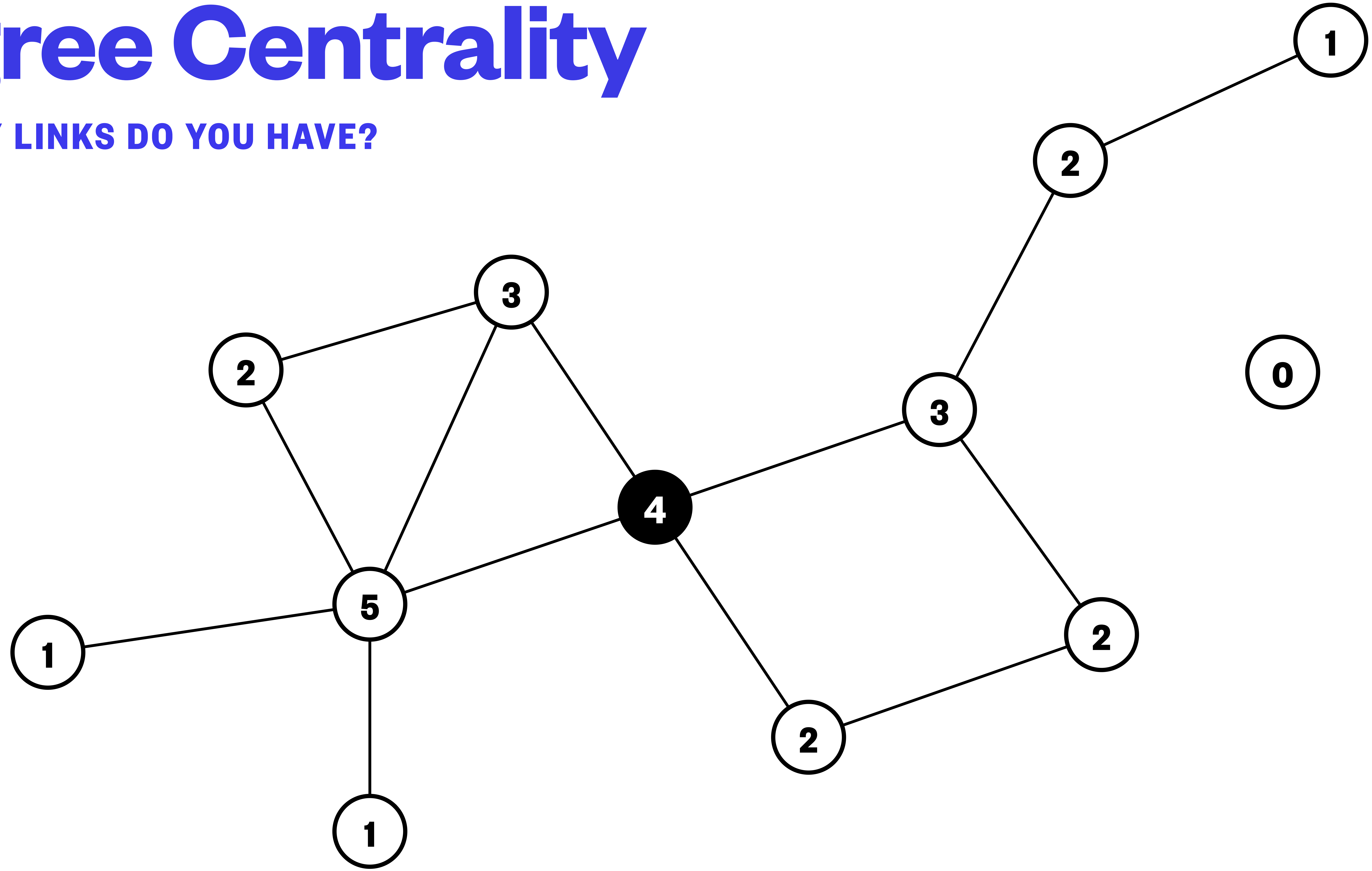
Measures of Centrality

Which node do you think seems to be most central?



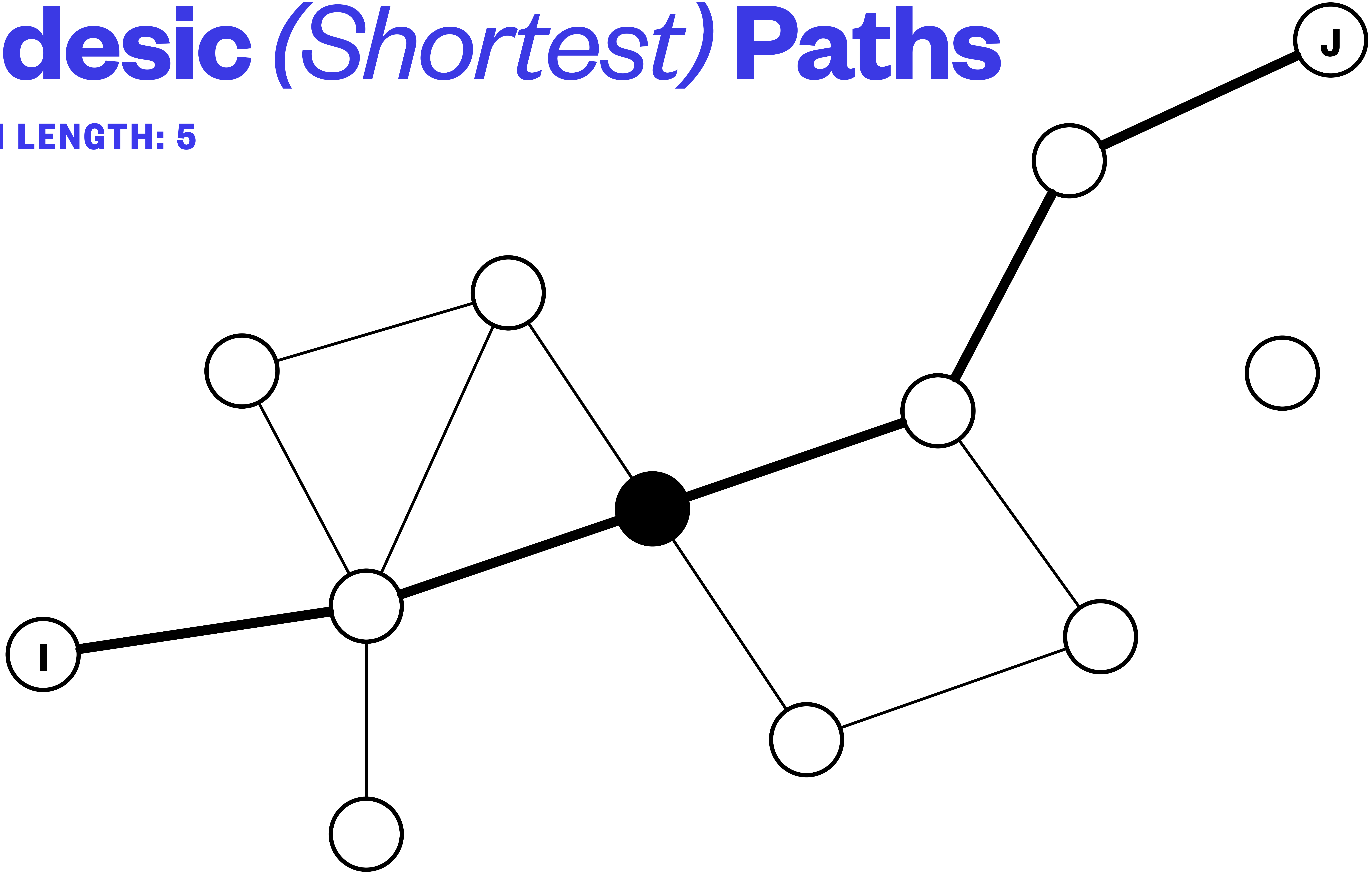
Degree Centrality

HOW MANY LINKS DO YOU HAVE?



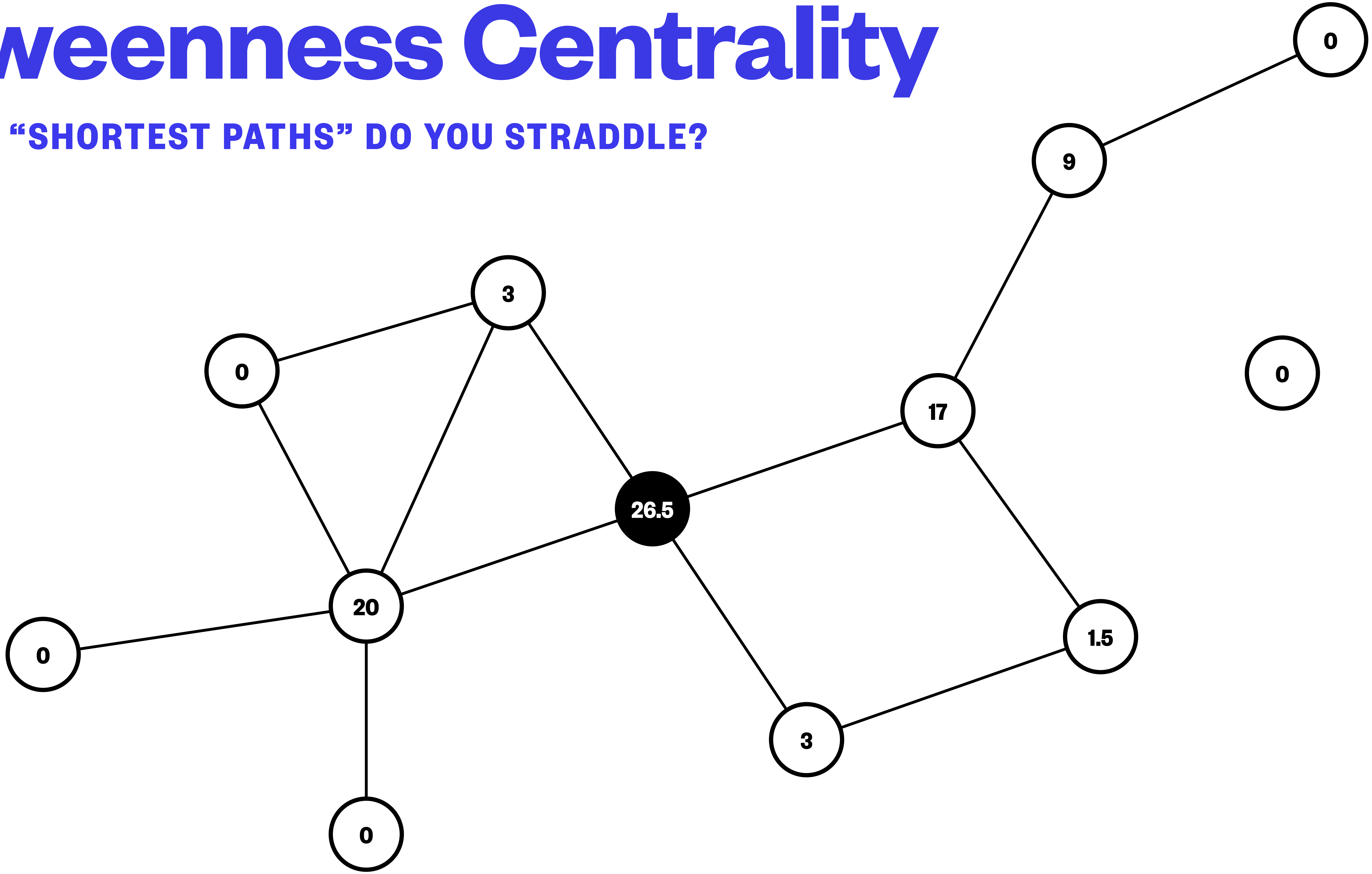
Geodesic *(Shortest)* Paths

I TO J PATH LENGTH: 5



Betweenness Centrality

HOW MANY “SHORTEST PATHS” DO YOU STRADDLE?



Measures of Centrality

OTHER MEASURES

- Closeness - how close is the given node to all other nodes?
- Eigenvector - are the other nodes that the chosen node is connected to also central nodes?
- Bespoke measures - power, influence, etc

Networks language

- We now know how to talk about networks
  - Main elements (nodes, edges)
  - Core variations (direction, weight)
  - Descriptors of components (dyads, triads)
  - Basic statistics (degree, centrality)
- We're ready

Part Three

How do we visualize networks?

Network Data

- The core element of a network is defining the **relationship(s) between the actors**
- Two main datasets to any network:
  - Data defining attributes of the **nodes**
  - Data defining attributes of the **edges**
- Let's motivate with a simple example: the network of agreement among members of the Supreme Court in the 2020-2021 term
  - https://harvardlawreview.org/supreme-court-statistics/

Node data: the node list

supreme_nodelist.csv

id	justice	abbrev	type	party	president	year	seniority
j01	Roberts	JR	Chief	Republican	Bush Jr	2005	16
j02	Thomas	CT	Associate	Republican	Bush Sr	1991	30
j03	Breyer	SB	Associate	Democrat	Clinton	1994	27
j04	Alito	SA	Associate	Republican	Bush Jr	2006	15
j05	Sotomayor	SS	Associate	Democrat	Obama	2009	12
j06	Kagan	EK	Associate	Democrat	Obama	2010	11
j07	Gorsuch	NG	Associate	Republican	Trump	2017	4
j08	Kavanaugh	BK	Associate	Republican	Trump	2018	3
j09	Barrett	ACB	Associate	Republican	Trump	2020	1

- A pretty ordinary looking dataset, similar to what we'd see in cross-sectional analysis
- Each row corresponds to a justice, each column corresponds to an attribute of the justice

Edge data: the edge list

supreme_edgelist.csv

from	to	type	weight
j01	j02	agreement	0.463
j01	j03	agreement	0.488
j01	j04	agreement	0.625
j01	j05	agreement	0.366
j01	j06	agreement	0.463
j01	j07	agreement	0.512
j01	j08	agreement	0.927
j01	j09	agreement	0.743
j02	j03	agreement	0.293
j02	j04	agreement	0.525
j02	j05	agreement	0.171
j02	j06	agreement	0.241

- Each row corresponds to an edge/link in the dataset
  - IDs link the node list and edge list
- Each column is an attribute of the edge
- This network is *undirected* (the agreement between j01 and j02 is the same as the agreement between j02 and j01)
  - Only a single row per relation
  - A *directed* network would have not just a j01-j02 row, but a j02-j01 row as well

More edge data: the adjacency matrix

supreme_adjacency.csv

	j01	j02	j03	j04	j05	j06	j07	j08	j09
j01	.	0.463	0.488	0.625	0.366	0.463	0.512	0.927	0.743
j02	.	.	0.293	0.525	0.171	0.341	0.707	0.488	0.600
j03	.	.	.	0.200	0.805	0.854	0.366	0.537	0.429
j04	.	.	.	.	0.125	0.175	0.600	0.600	0.588
j05	.	.	.	.	.	0.805	0.244	0.415	0.314
j06	.	.	.	.	.	.	0.415	0.512	0.486
j07	.	.	.	.	.	.	.	0.561	0.686
j08	.	.	.	.	.	.	.	.	0.800
j09	.	.	.	.	.	.	.	.	.

- Each cell corresponds to an edge/link in the dataset
  - The weight of each edge is given by the value of the cell
- This network is *undirected* (the agreement between j01 and j02 is the same as the agreement between j02 and j01)
  - Only a single cell per relation
  - A *directed* network would have not just a j01-j02 cell, but a j02-j01 cell as well
- Unlike an edge list, only one attribute per link

Using R (and iGraph) for Social Networks

- R’s advantages:
  - Easily integrates with the rest of a data workflow
  - More programmatically flexible (for the programmatically inclined) than GUIs
  - Reproducible
  - Free!
- R’s “disadvantages”:
  - Needs to be scripted/programmed
  - Network visualization not built in; must use additional libraries, which themselves have different strengths and weaknesses
- **iGraph** vs. **Statnet**; assorted others for interactive and dynamic networks

Loading the data

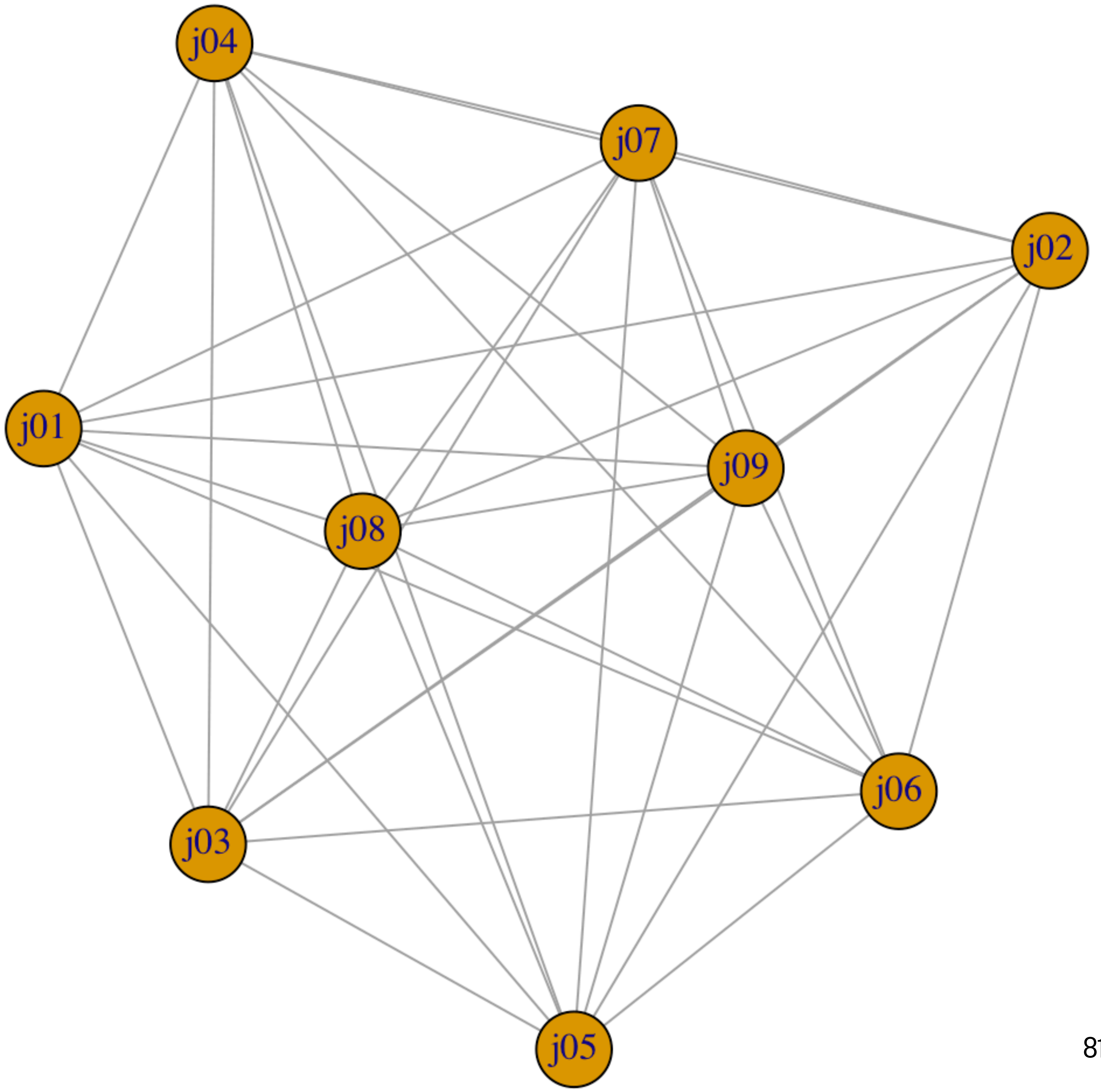
```
#Load library
library(“igraph”)

#Load nodelist and edgelist as objects
nodes <- read.csv("supreme_nodes.csv", header=T, as.is=T)
links <- read.csv("supreme_edgelist.csv", header=T, as.is=T)

#Convert to an iGraph network. “d” identifies the edgelist; “vertices” identifies the nodelist
net <- graph_from_data_frame(d=links, vertices=nodes, directed=F)

#If we want to output an adjacency matrix, we can
#(we just need to identify the attribute to encode)
adjacency<-as_adjacency_matrix(net, attr="weight")
```

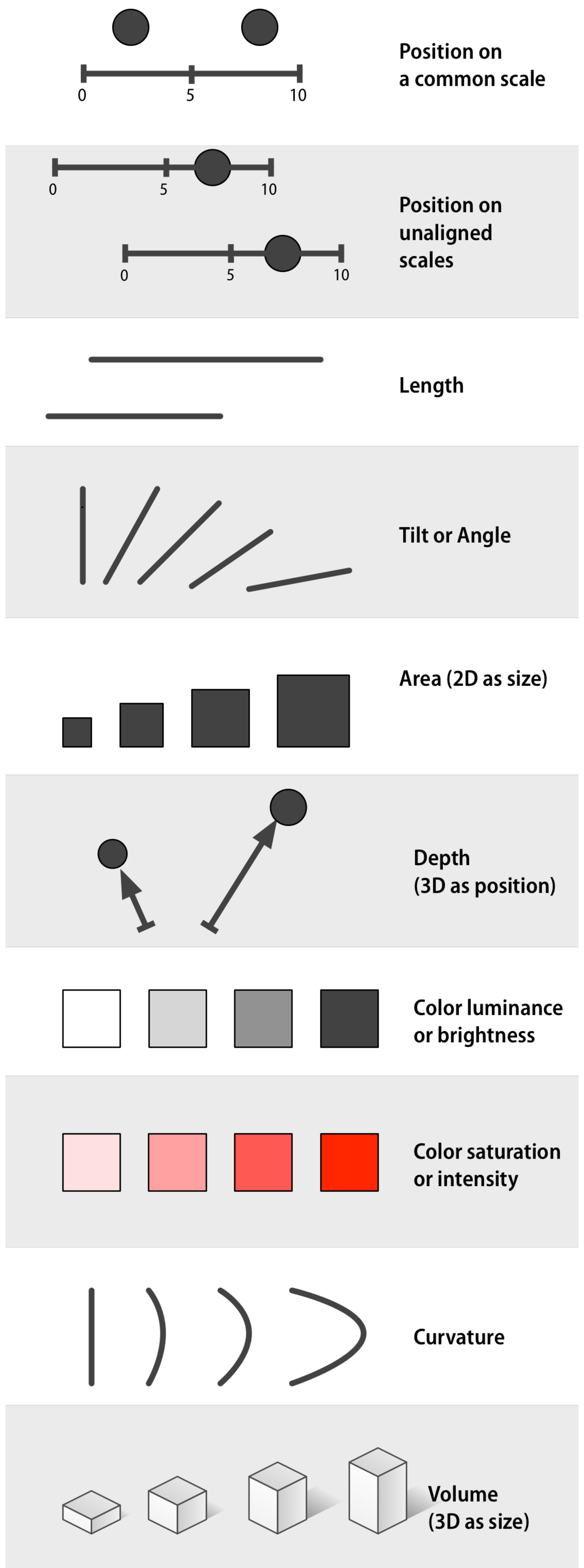
Working with the data

Command	**Usage**
`E(net)`	Access the edges of the network
`V(net)`	Access the nodes of the network
`E(net)$weight`	Access a particular attribute (weight) of the edges of the network
`V(net)$seniority`	Access a particular attribute (seniority) of the nodes of the network
`V(net)[president=="Obama"]`	Returns all vertices with appointing president "Obama"
`E(net)[weight>.9]`	Returns all edges with weight greater than .9
`net[1,]`	Returns first row of network matrix
`net[5,7]`	Returns cell in the fifth row, seventh column
`plot.igraph(net)` ***or*** `plot(net)`	**Plots the network (!)**

plot.igraph(net)

- And . . . . ok, but, it's kind of . . .
  - uninspired
- What's wrong?
  - Links are overplotted
  - Links are undifferentiated
  - Node labels are uninspiring
  - Colors
- How should we fix it?





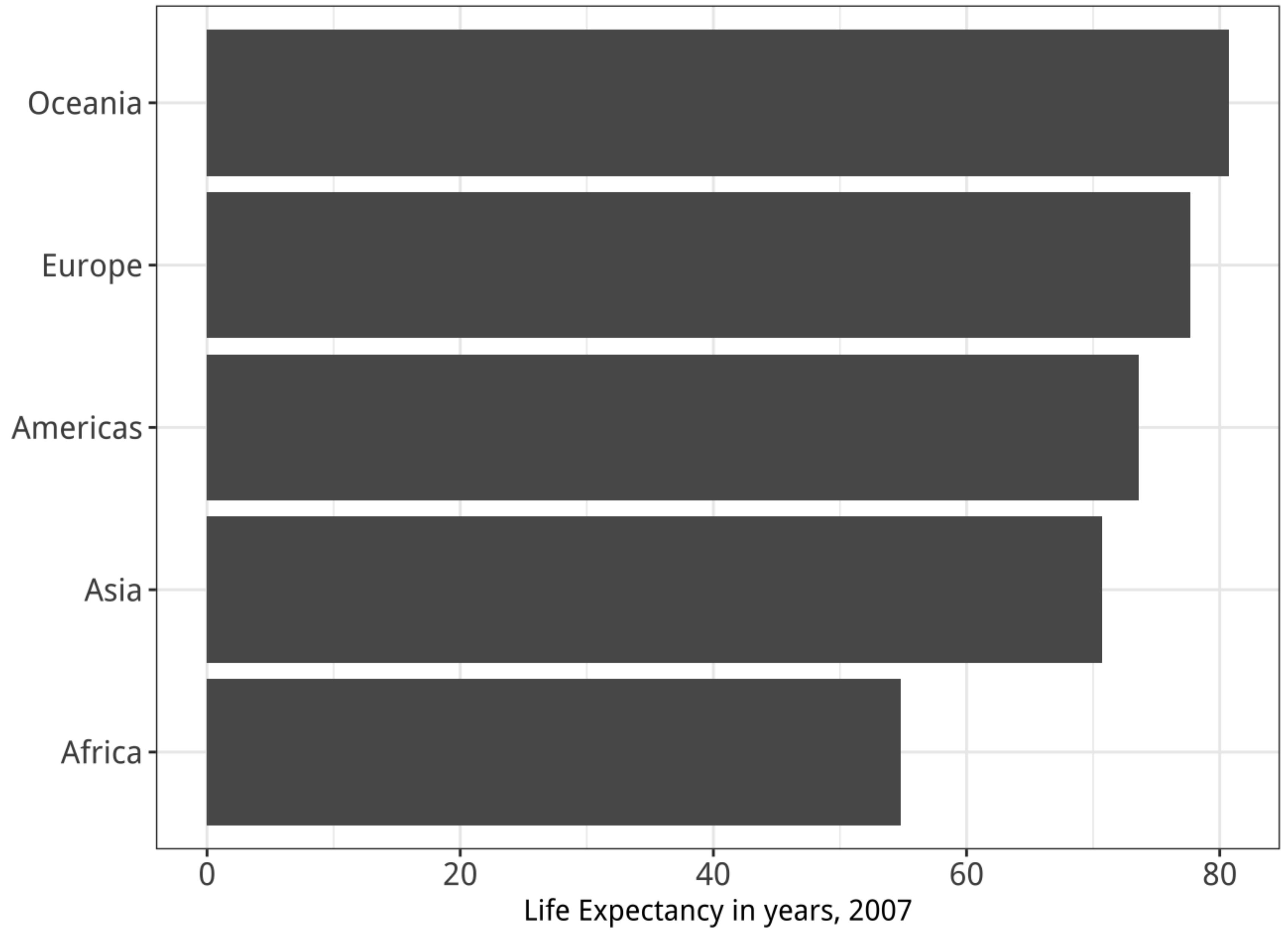
Graphics guidelines

- Data does not speak for itself
- Like in regular graphics and visualization, plotting networks is a matter of **taste**, not (unfortunately) science
  - *Tastes can differ, but . . .*
- Healy (2020) identifies three common graphics challenges to focus on:
  - **Aesthetic** - inconsistent or displeasing design choices
  - **Substantive** - the data presented are mistaken, incorrect, or misleading
  - **Perceptual** - something about the presentation doesn't easily translate to information through human visual apparatus

Healy, K. (2020) Data Visualization: A Practical Introduction. Retrieved from www.socviz.co

Bad graphics

- Tufte (2001) suggests that **chartjunk** is often to blame, with too much detritus on the graphic getting in the way of the information being presented
  - **Data-ink ratio -** the amount of “ink” used to achieve **data communication goals** vs the total amount of ink on the graphic

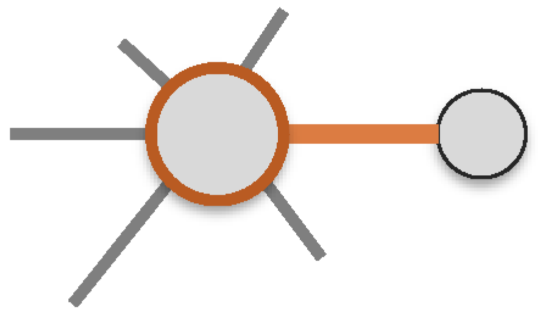


Visualization guidelines for networks

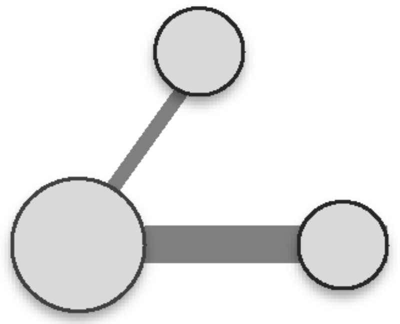
- Ognyanova (2021)
  - What visualization **goals** to you have? What is(are) the main relationship(s) you are trying to illustrate?
  - What **type** of network visualization do you want to use?
  - What **elements** do you want to utilize in your visualization to illustrate contrast in your network?
  - What **aesthetics** should you be aware of when plotting networks

Network visualization goals

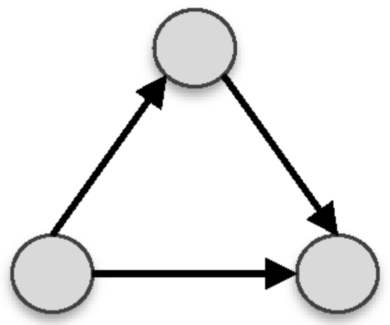
Key actors and links



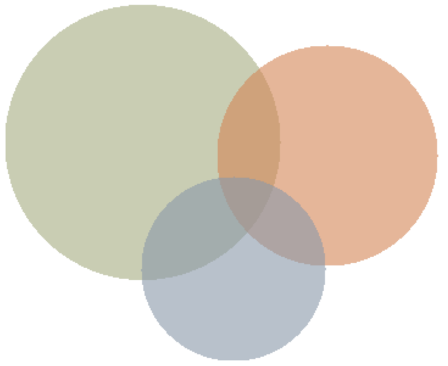
Relationship strength



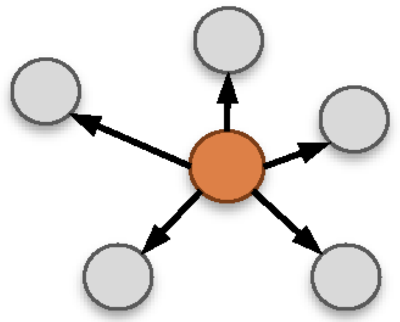
Structural properties



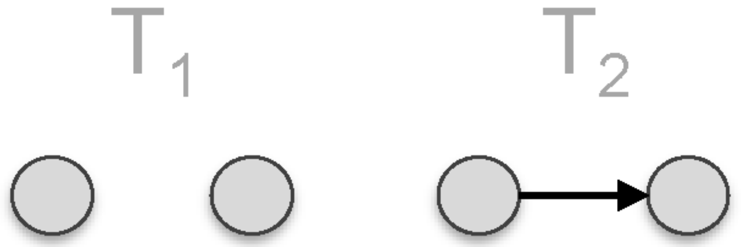
Communities



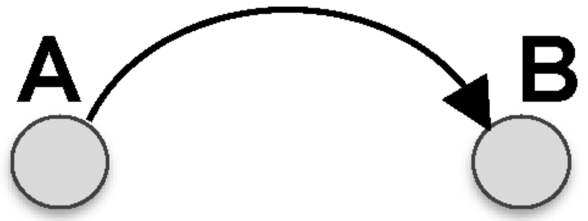
Diffusion patterns



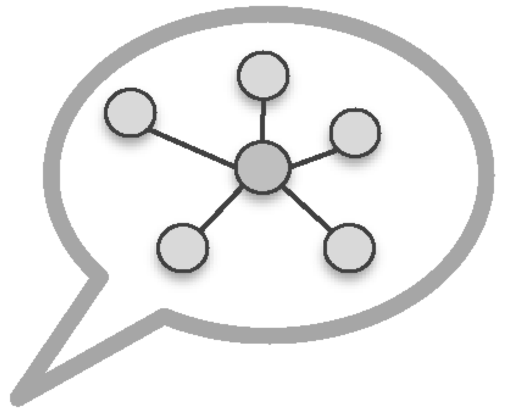
Network evolution



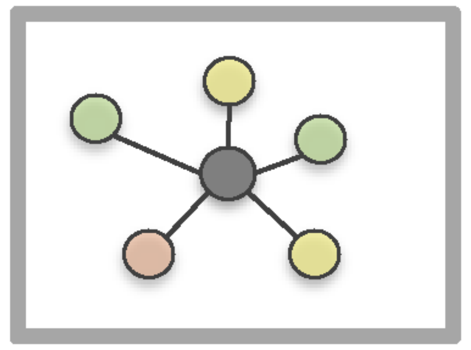
Networks as maps



Networks as persuasion



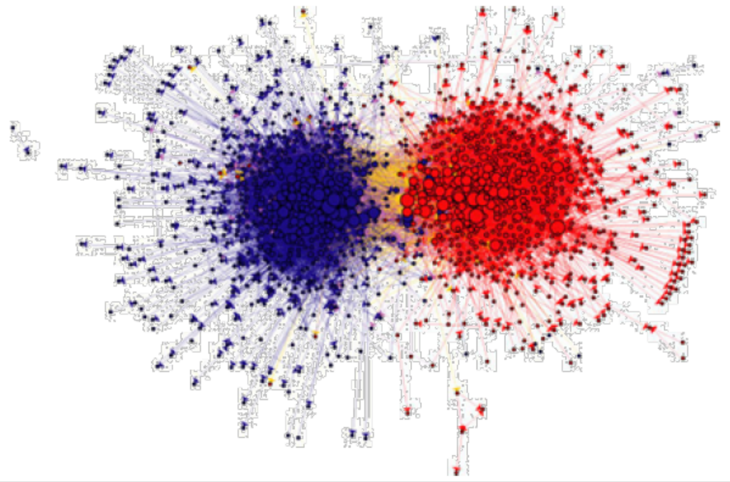
Networks as art



Ognyanova, K. (2021) Network visualization with R. Retrieved from www.kateto.net/network-visualization

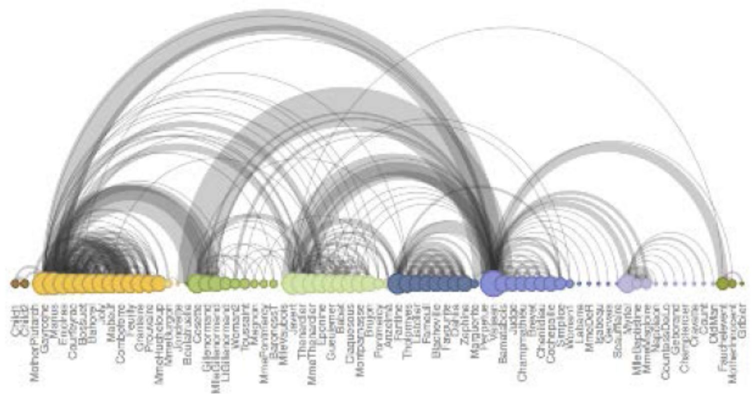
Some network visualization types

Network Maps

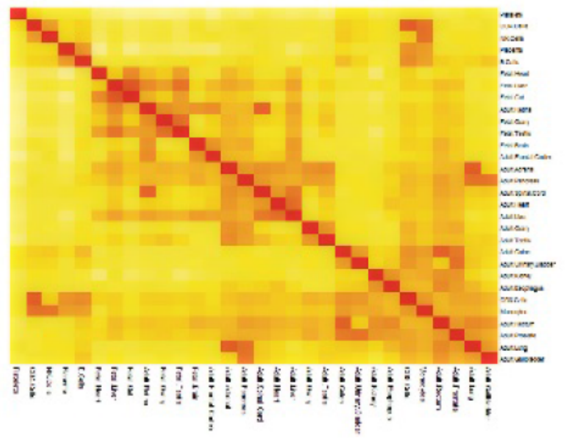


Statistical charts

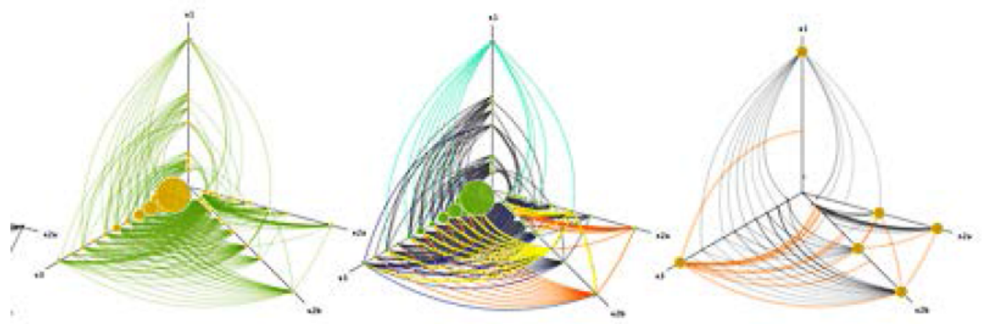
Arc diagrams



Heat maps



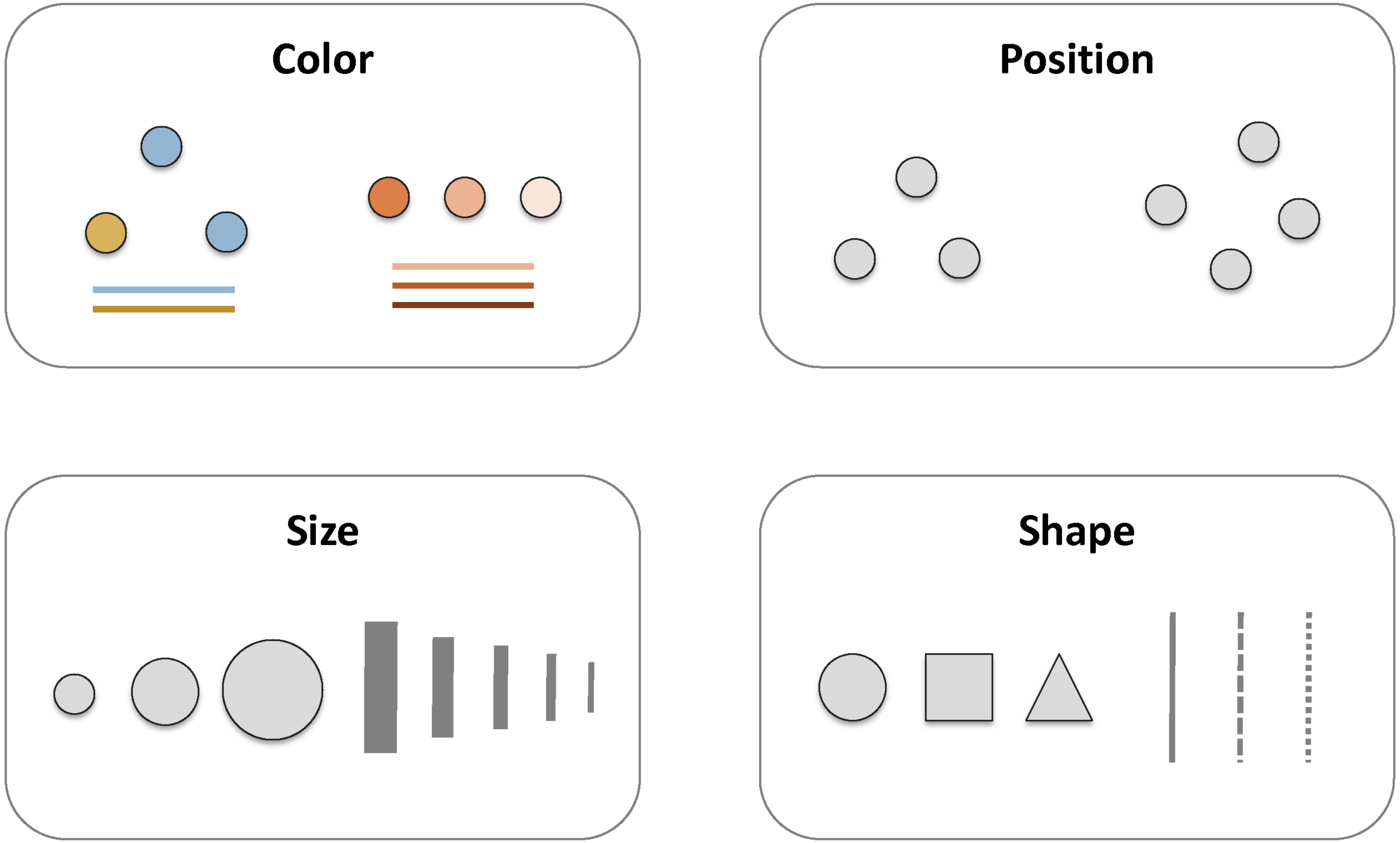
Hive plots



Biofabric

Ognyanova, K. (2021) Network visualization with R. Retrieved from www.kateto.net/network-visualization

Network visualization controls



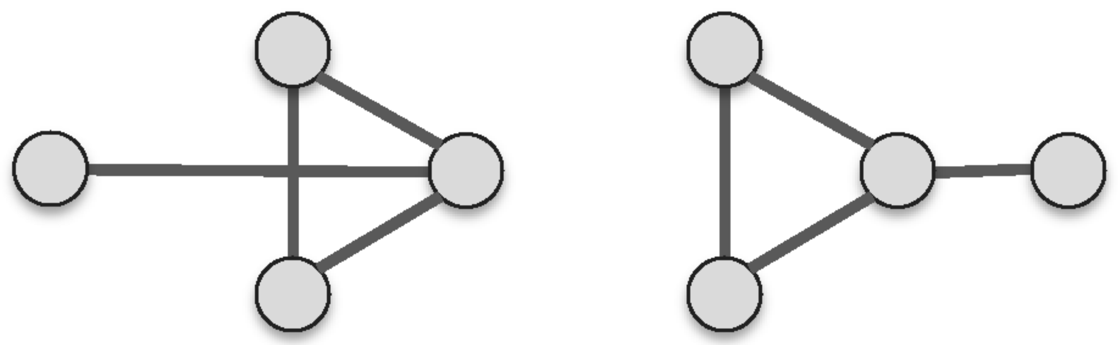
Honorable mention: arrows (direction) and labels (identification)

Ognyanova, K. (2021) Network visualization with R. Retrieved from www.kateto.net/network-visualization

Layout aesthetics

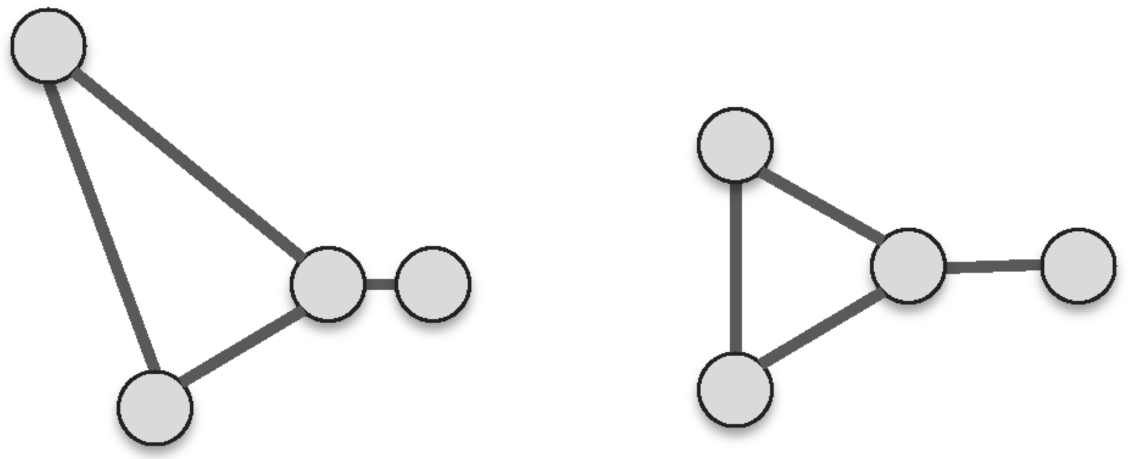
Minimize edge crossing

No Yes



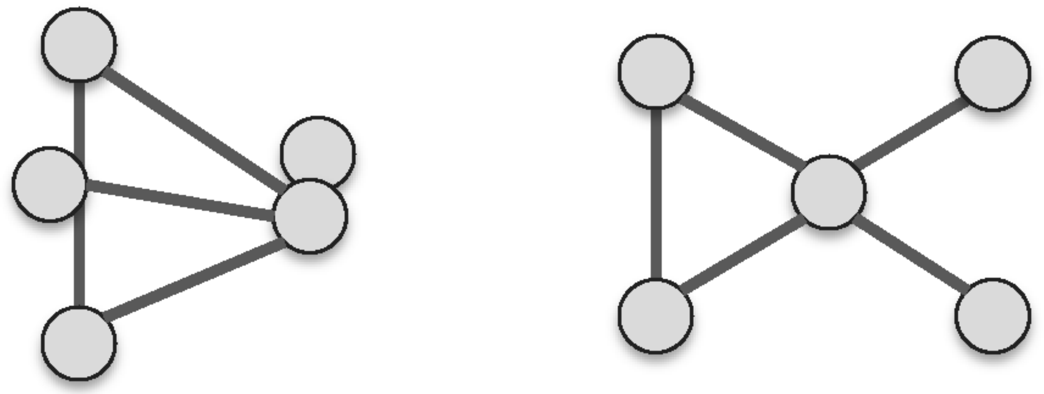
Uniform edge length

No Yes



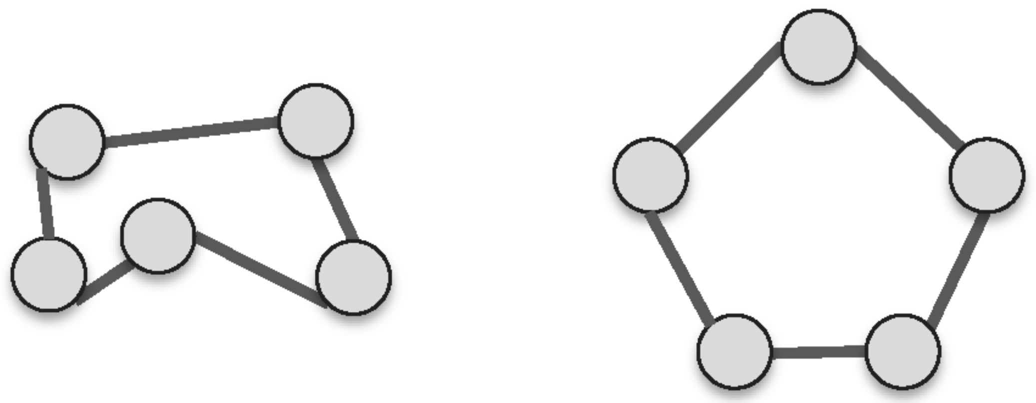
Prevent overlap

No Yes



Symmetry

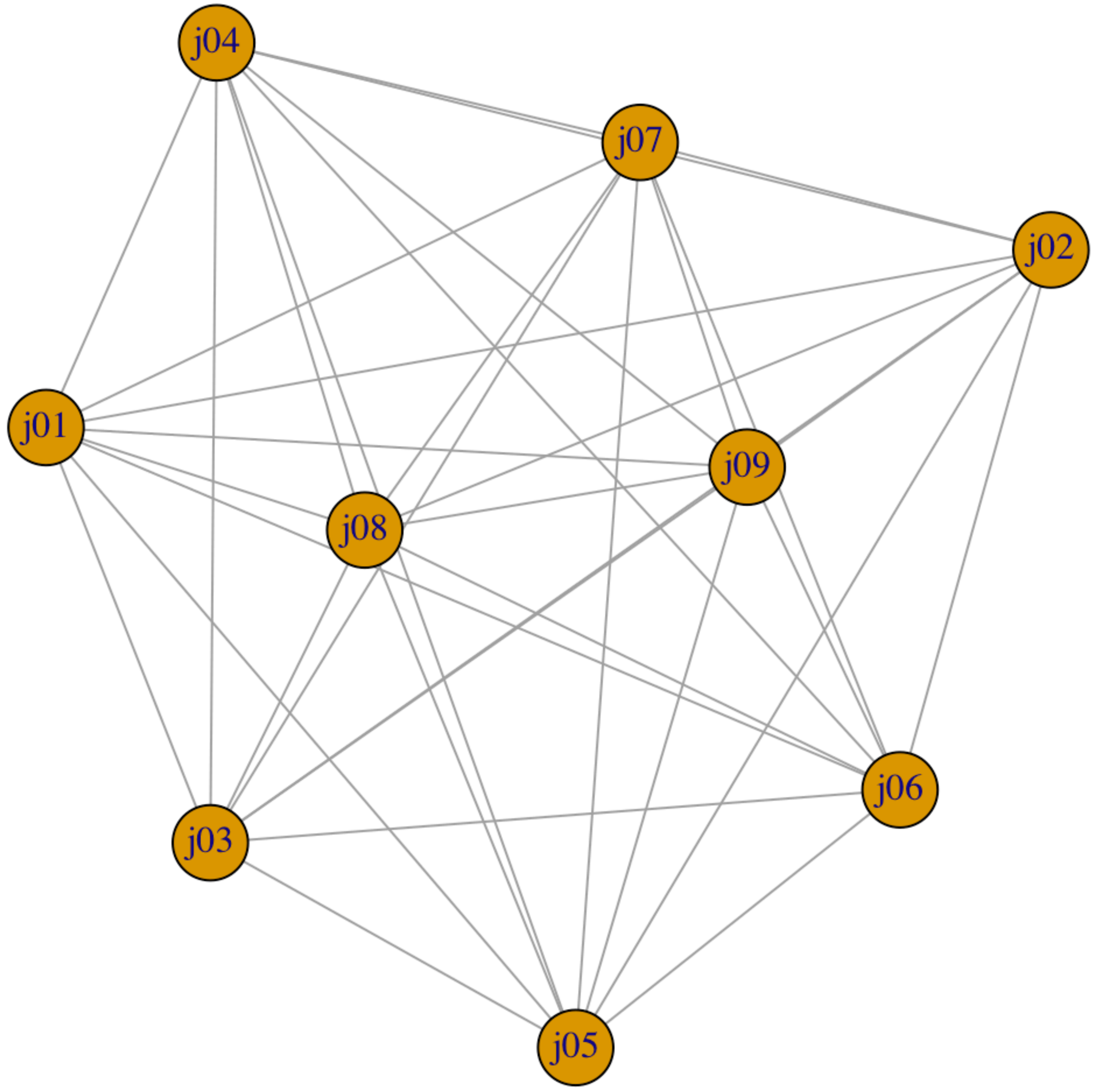
No Yes



Ognyanova, K. (2021) Network visualization with R. Retrieved from www.kateto.net/network-visualization

Goals in the Supreme Court network

- Identify **who** the justices are
- Illustrate external **political factors** relevant to the Supreme Court
- Show who the most **central** (likely “decisive”) justices are
- Show **agreement** and **disagreement** among the justices



Goals in the Supreme Court network

- Identify **who** the justices are → *Label the nodes*
- Illustrate external **political factors** relevant to the Supreme Court → *Color the nodes to show party of appointment*
- Show who the most **central** (likely "decisive") justices are → *Calculate centrality and illustrate it visually*
- Show **agreement** and **disagreement** among the justices → *Do something with the ties/edges - thickness and/or color*

Along the way, don't forget about other aesthetics: color, tie overlap, etc.

Controlling iGraph graphic elements

- Two ways of editing network graphs
  - Use parameters of the `plot.igraph` command
  - Write information about graphical attributes to the network object itself (that `plot.igraph` will then read)
- Command order and priority
  - Parameters of the plot.igraph command itself will overwrite information written into the network object

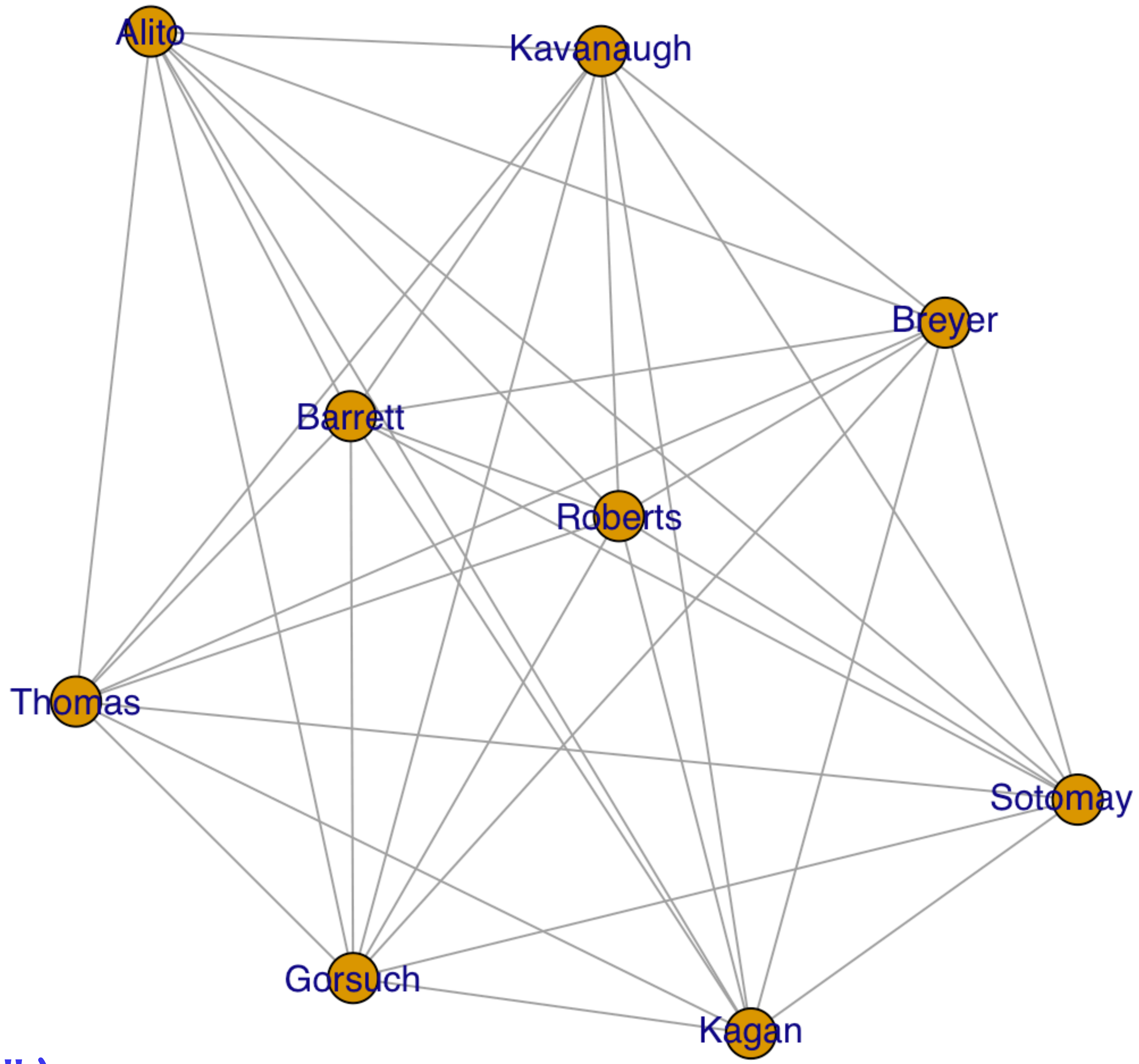
Plotting parameters

NODES	
vertex.color	Node color
vertex.frame.color	Node border color
vertex.shape	One of “none”, “circle”, “square”, “csquare”, “rectangle” “crectangle”, “vrectangle”, “pie”, “raster”, or “sphere”
vertex.size	Size of the node (default is 15)
vertex.size2	The second size of the node (e.g. for a rectangle)
vertex.label	Character vector used to label the nodes
vertex.label.family	Font family of the label (e.g.“Times”, “Helvetica”)
vertex.label.font	Font: 1 plain, 2 bold, 3, italic, 4 bold italic, 5 symbol
vertex.label.cex	Font size (multiplication factor, device-dependent)
vertex.label.dist	Distance between the label and the vertex
vertex.label.degree	The position of the label in relation to the vertex, where 0 is right, “pi” is left, “pi/2” is below, and “-pi/2” is above

Plotting parameters

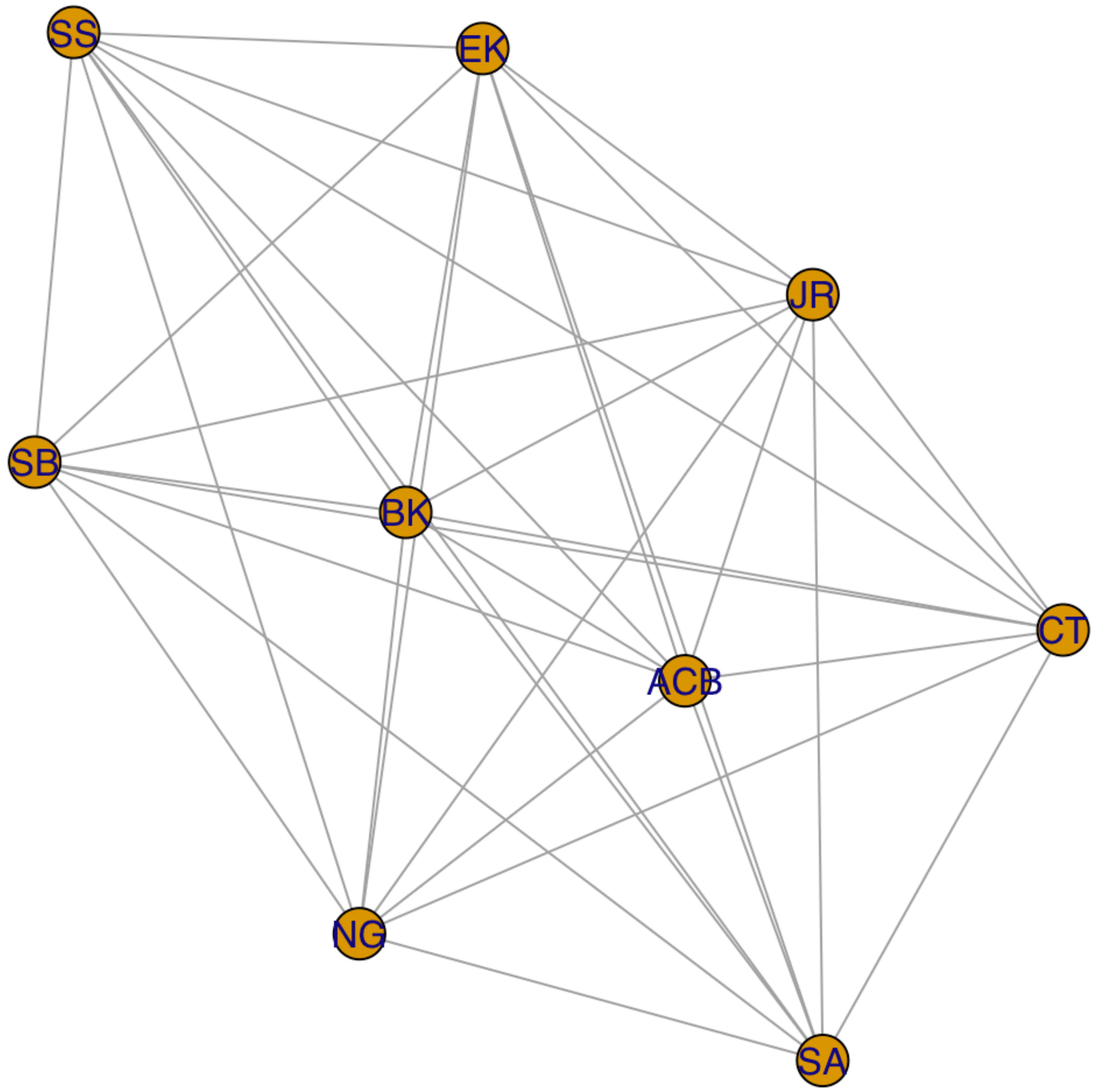
EDGES	
edge.color	Edge color
edge.width	Edge width, defaults to 1
edge.arrow.size	Arrow size, defaults to 1
edge.arrow.width	Arrow width, defaults to 1
edge.lty	Line type, could be 0 or “blank”, 1 or “solid”, 2 or “dashed”, 3 or “dotted”, 4 or “dotdash”, 5 or “longdash”, 6 or “twodash”
edge.label	Character vector used to label edges
edge.label.family	Font family of the label (e.g.“Times”, “Helvetica”)
edge.label.font	Font: 1 plain, 2 bold, 3, italic, 4 bold italic, 5 symbol
edge.label.cex	Font size for edge labels
edge.curved	Edge curvature, range 0-1 (FALSE sets it to 0, TRUE to 0.5)
arrow.mode	Vector specifying whether edges should have arrows, possible values: 0 no arrow, 1 back, 2 forward, 3 both

Label nodes



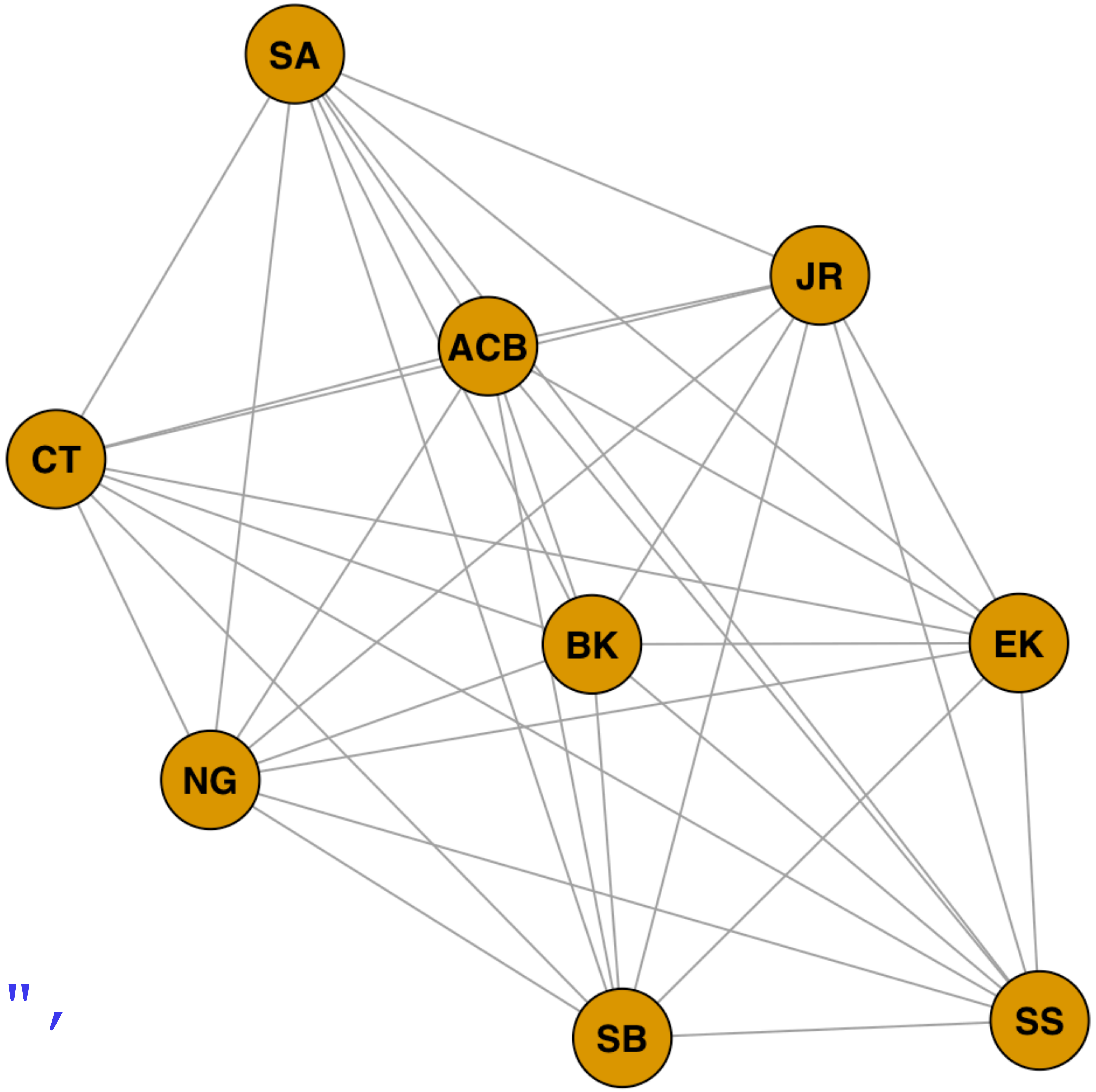

```
plot.igraph(net,
  vertex.label=V(net)$justice,
  vertex.label.family="Helvetica")
```

Label nodes



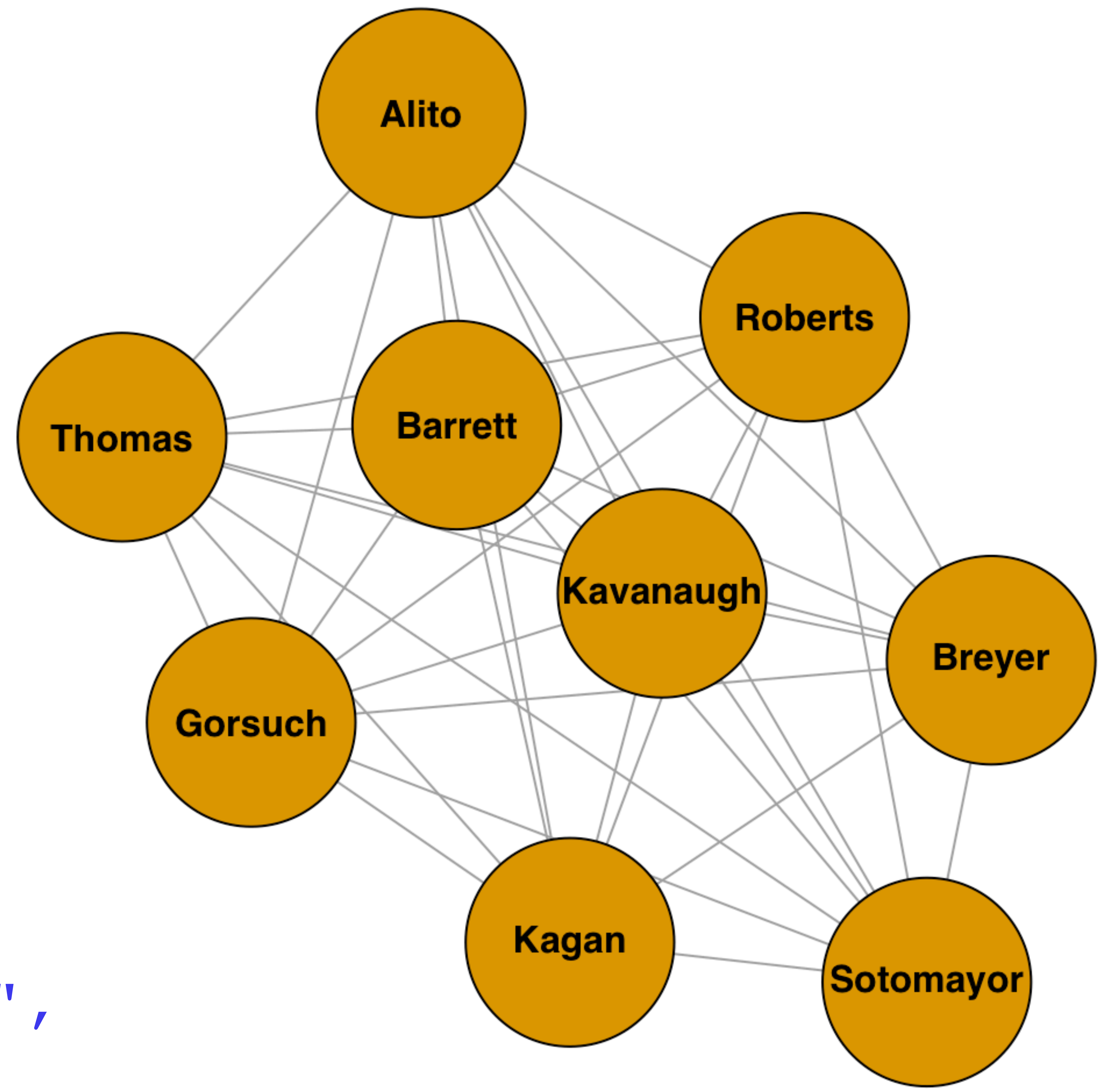

```
plot.igraph(net,
  vertex.label=V(net)$abbrev,
  vertex.label.family="Helvetica")
```

Label nodes




```
plot.igraph(net,
    vertex.label=V(net)$abbrev,
    vertex.label.family="Helvetica",
    vertex.label.font=2,
    vertex.label.color="black",
    vertex.size=20)
```

Label nodes

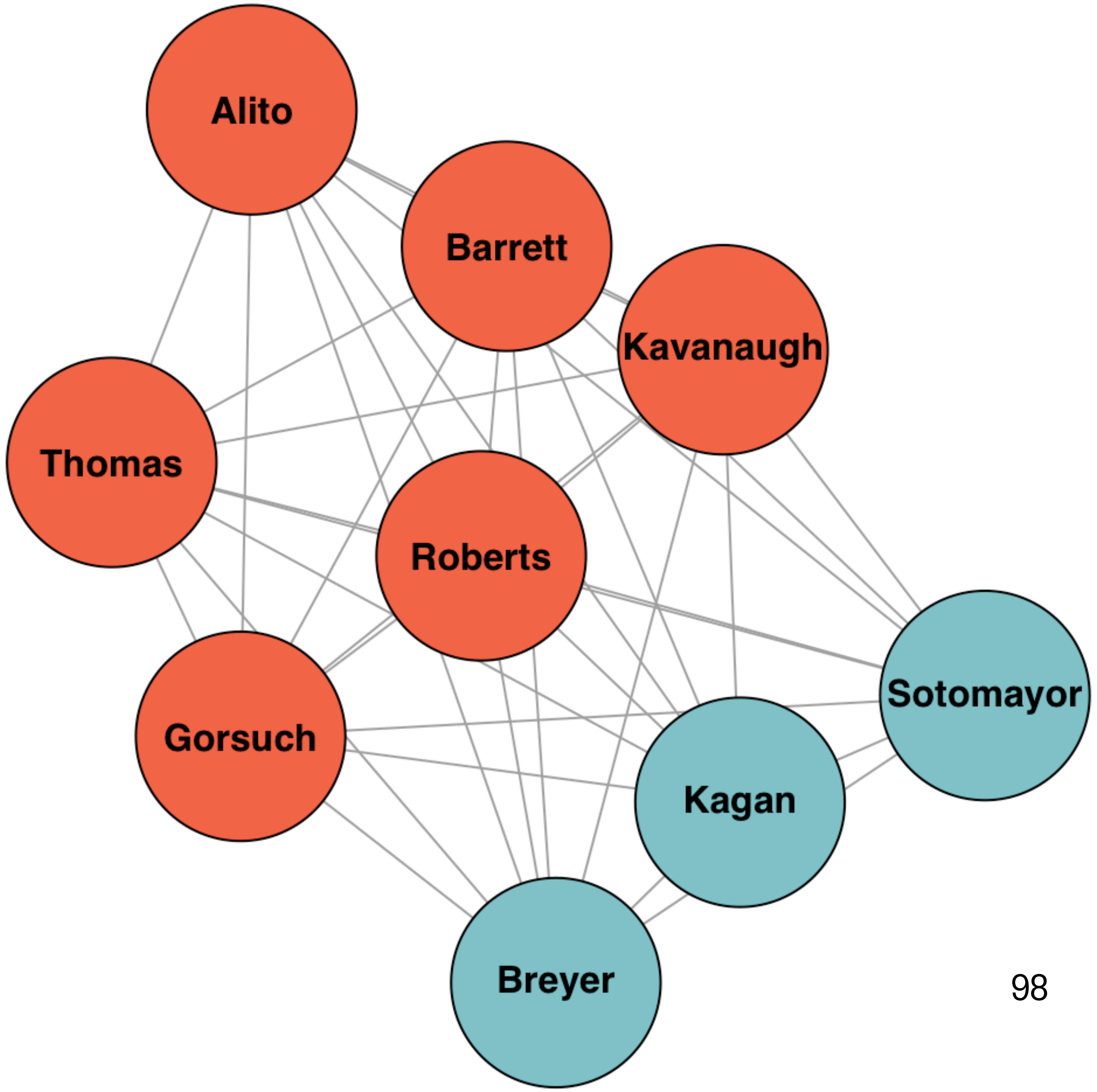



```
plot.igraph(net,
    vertex.label=V(net)$justice,
    vertex.label.family="Helvetica",
    vertex.label.font=2,
    vertex.label.color="black",
    vertex.size=48)
```

Color by appointment party

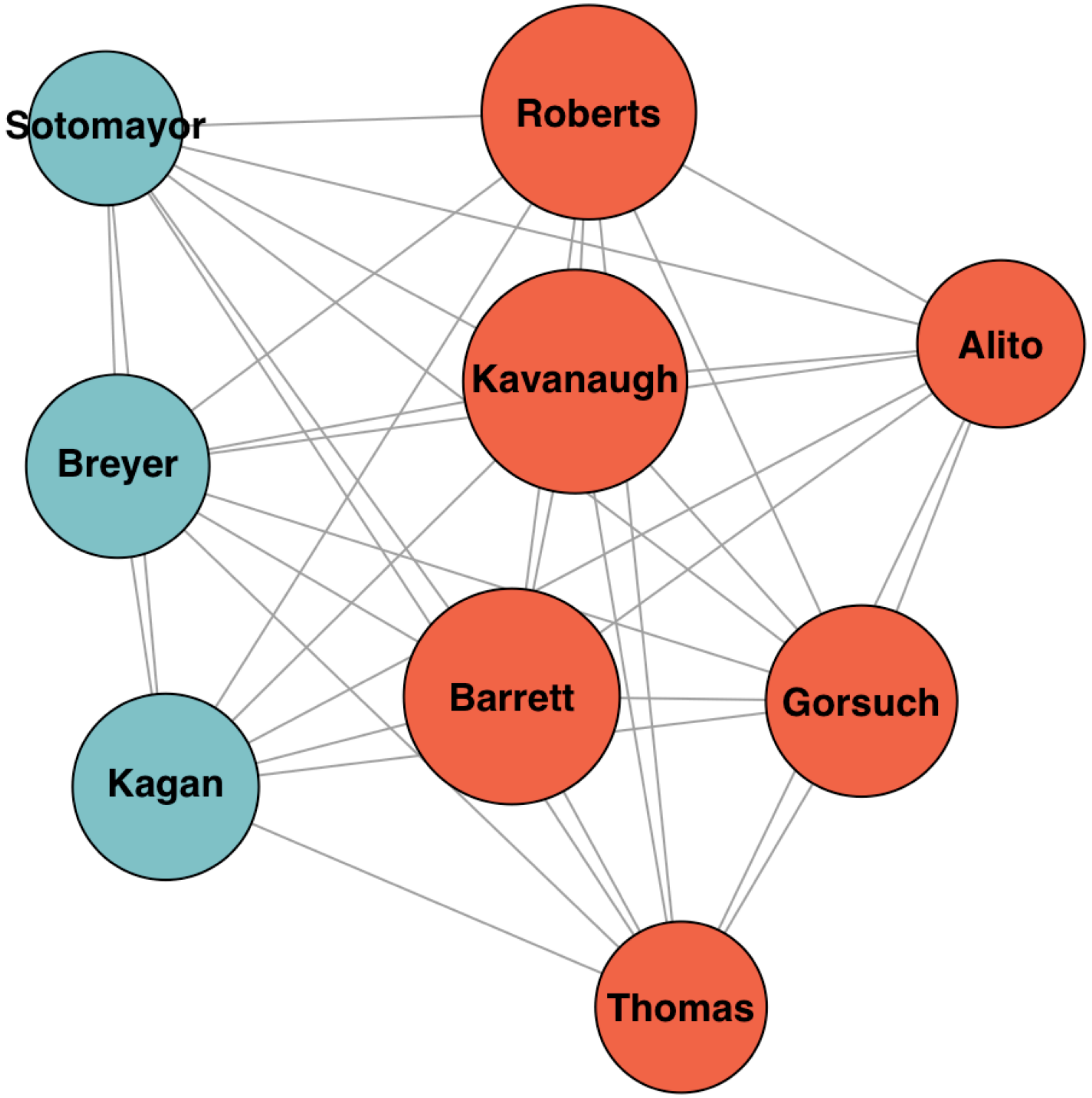
```
#Generate colors based on party and write into network:
V(net)$color <- ifelse(V(net)$party=="Republican","coral1","cadetblue3")

plot.igraph(net,
            vertex.label=V(net)$justice,
             vertex.label.family="Helvetica",
             vertex.label.font=2,
             vertex.label.color="black",
             vertex.size=48)
```

- Note that we no longer have to “keep” color in the main line of graph code, it’s “written in” to the network object itself



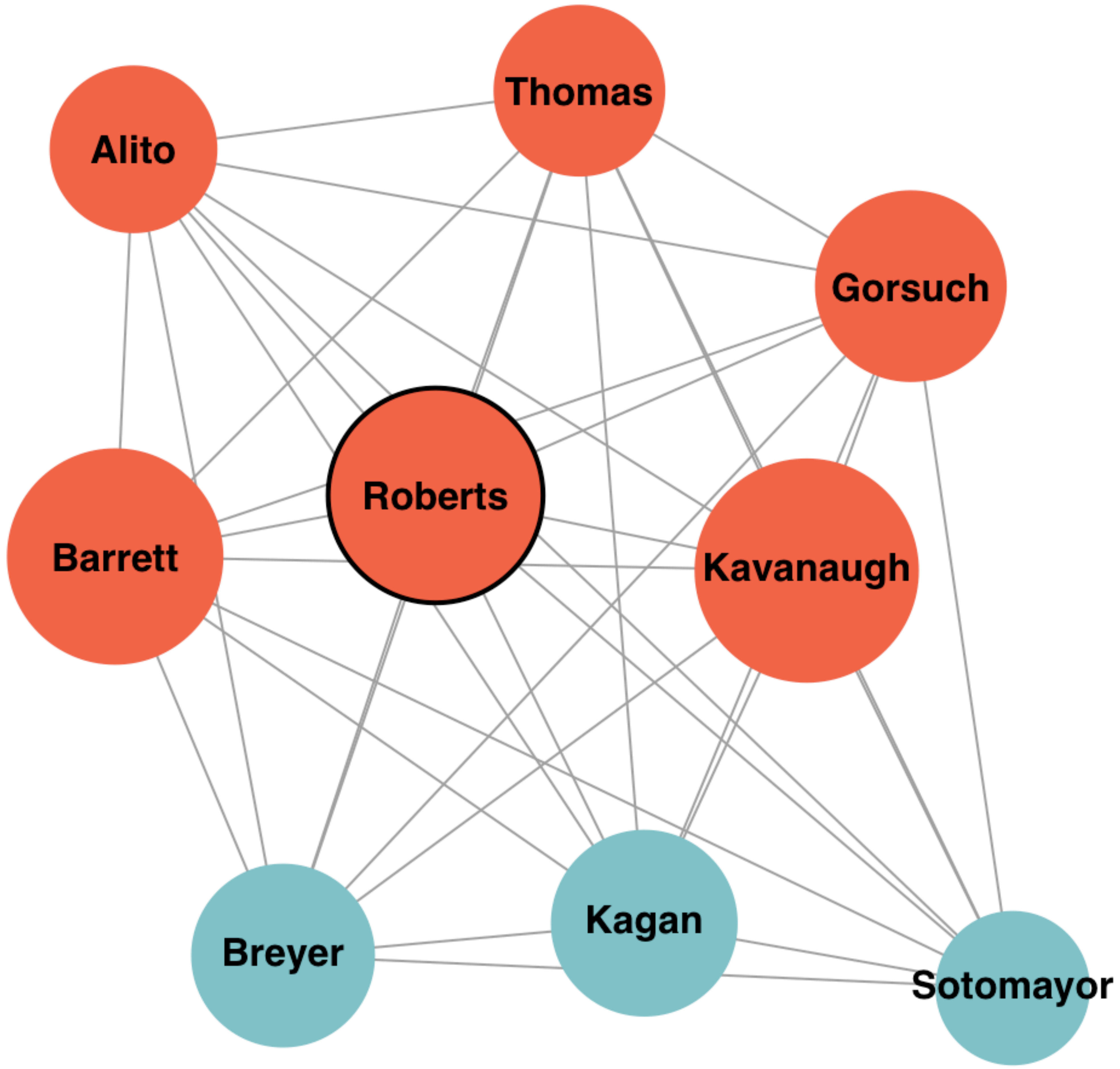
Scale nodes by centrality

```
V(net)$eigen<-evcent(net)$vector

plot.igraph(net,
  vertex.label=V(net)$justice,
  vertex.label.family="Helvetica",
  vertex.label.font=2,
  vertex.label.color="black",
  vertex.size=V(net)$eigen*50)
```



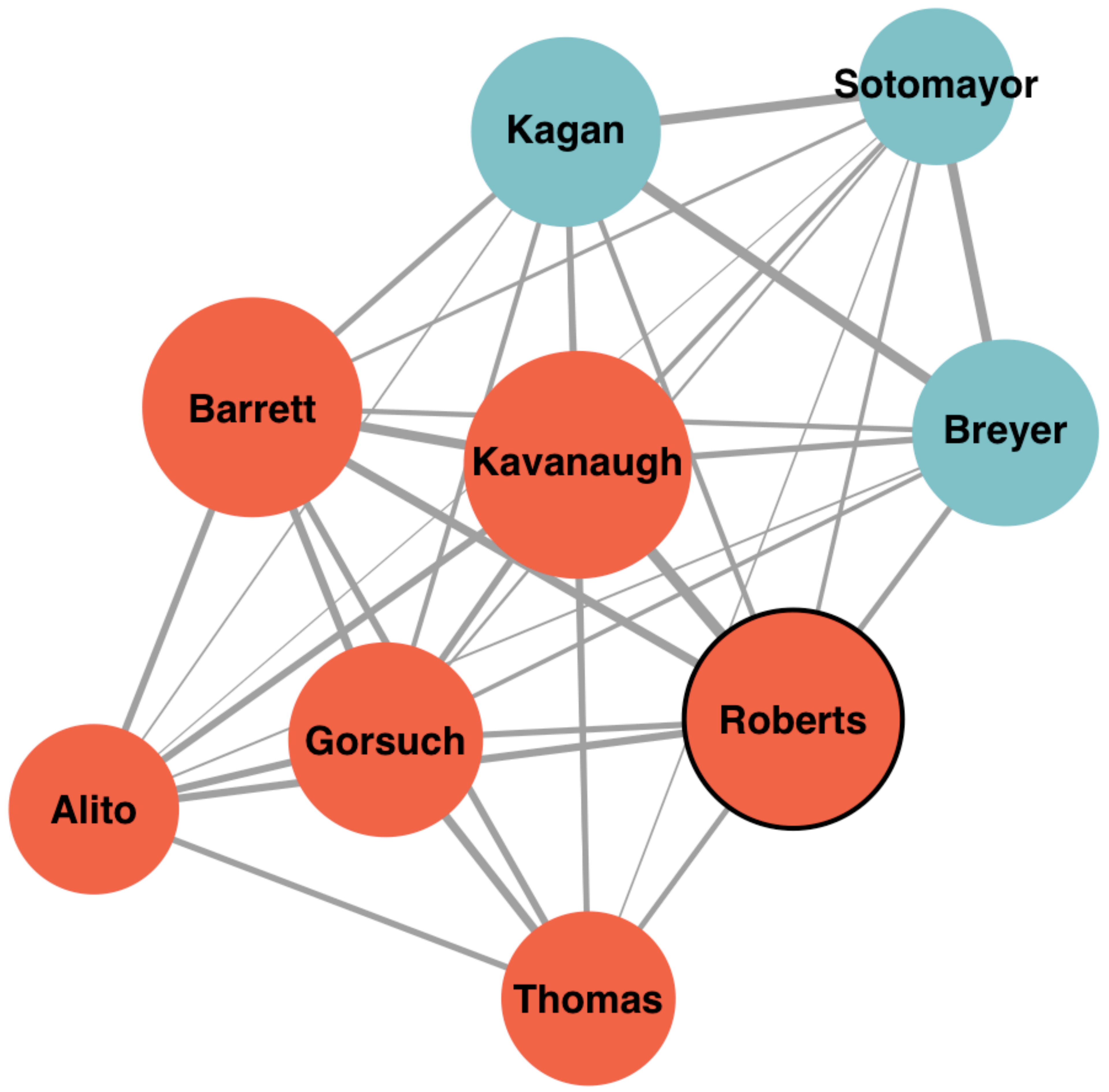
While we're at it

```
V(net)$width<-
  ifelse(V(net)$type=="Chief",2,1)

plot.igraph(net,
  vertex.label=V(net)$justice,
  vertex.label.family="Helvetica",
  vertex.label.font=2,
  vertex.label.color="black",
  vertex.size=V(net)$eigen*50,
  vertex.frame.width=V(net)$width)
```



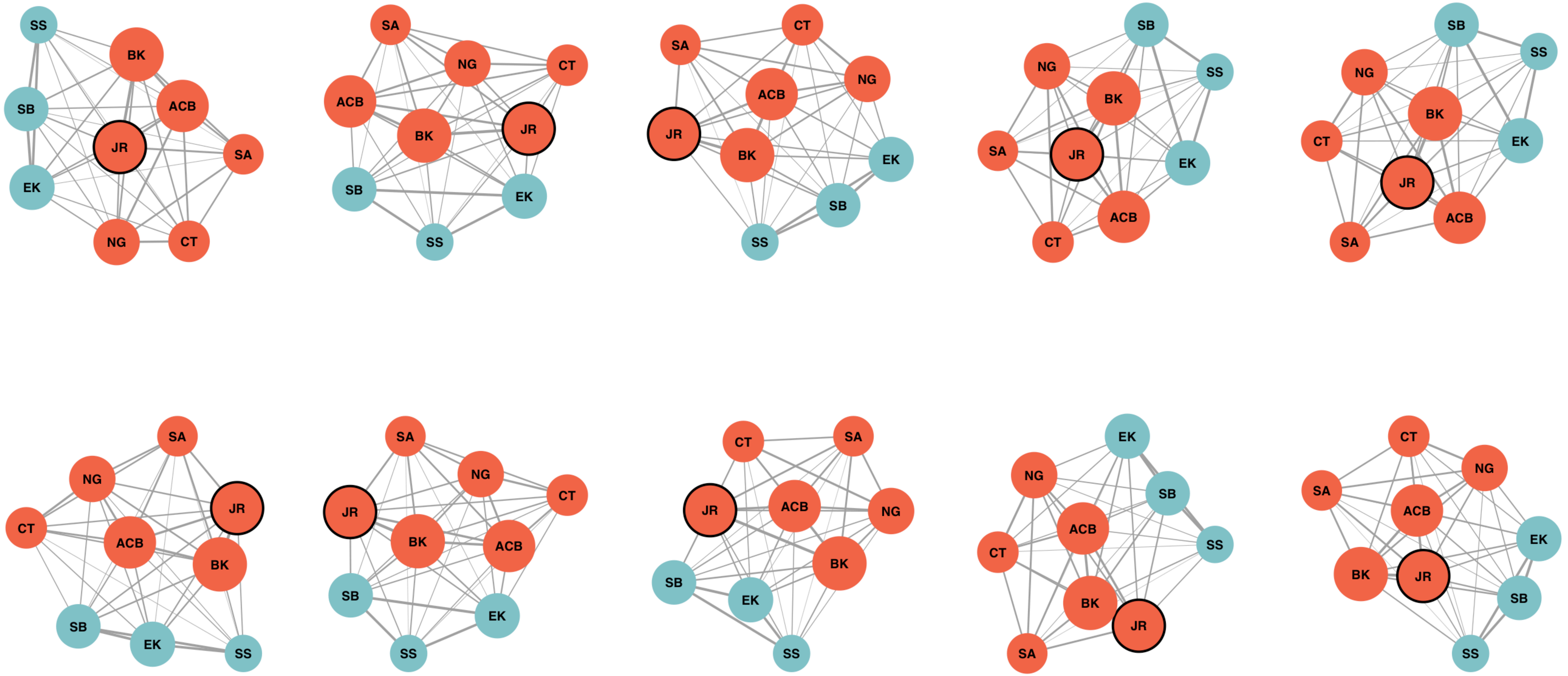
Finally: tie strength

```
plot.igraph(net,
  edge.width=E(net)$weight*5,
  vertex.label=V(net)$justice,
  vertex.label.family="Helvetica",
  vertex.label.font=2,
  vertex.label.color="black",
  vertex.size=V(net)$eigen*50,
  vertex.frame.width=V(net)$width)
```



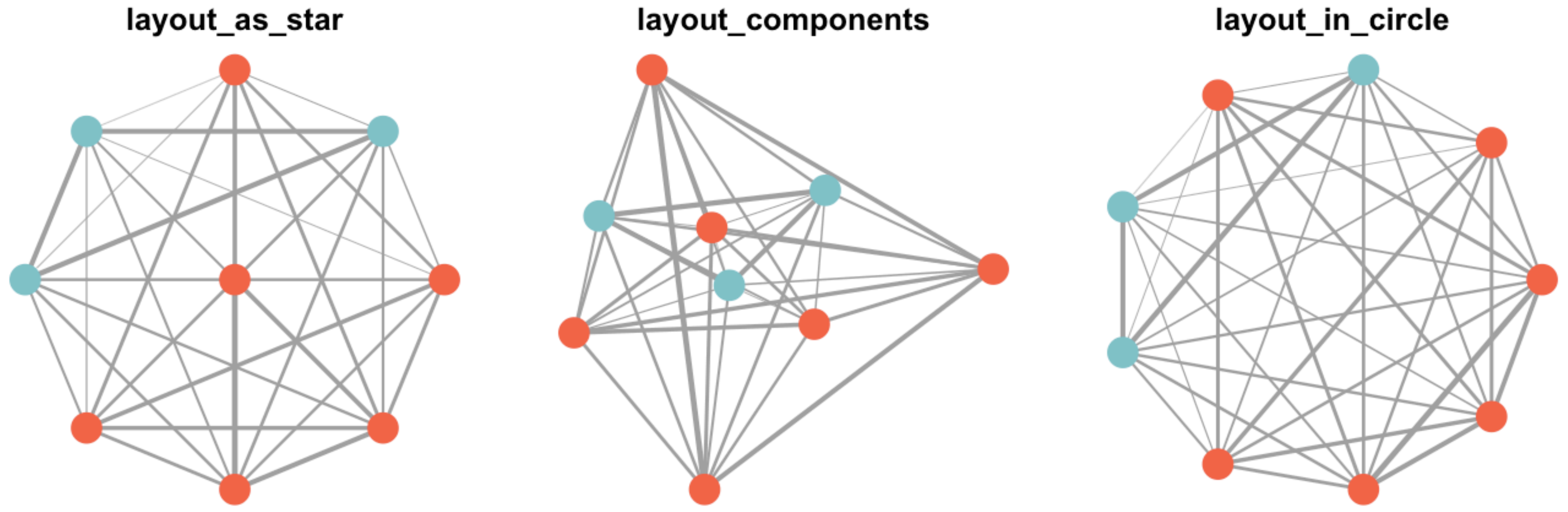
Graph layouts

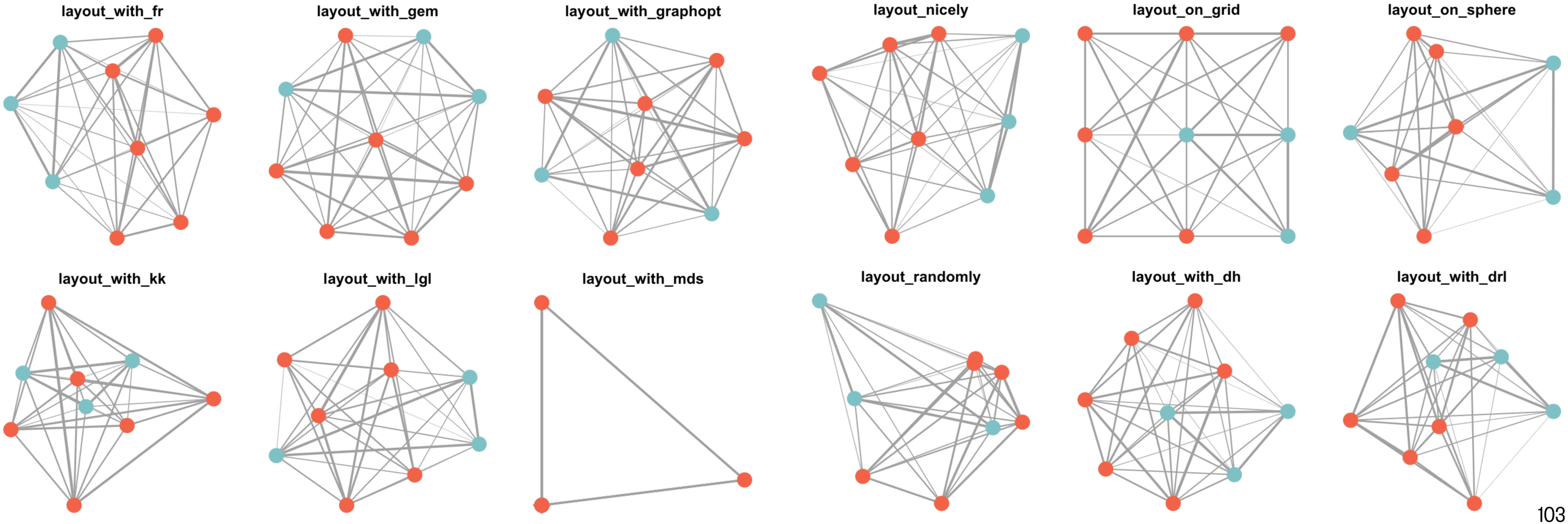
- iGraph generates layouts quasi-randomly within similar constraints; each time the network is drawn, the layout will look slightly different



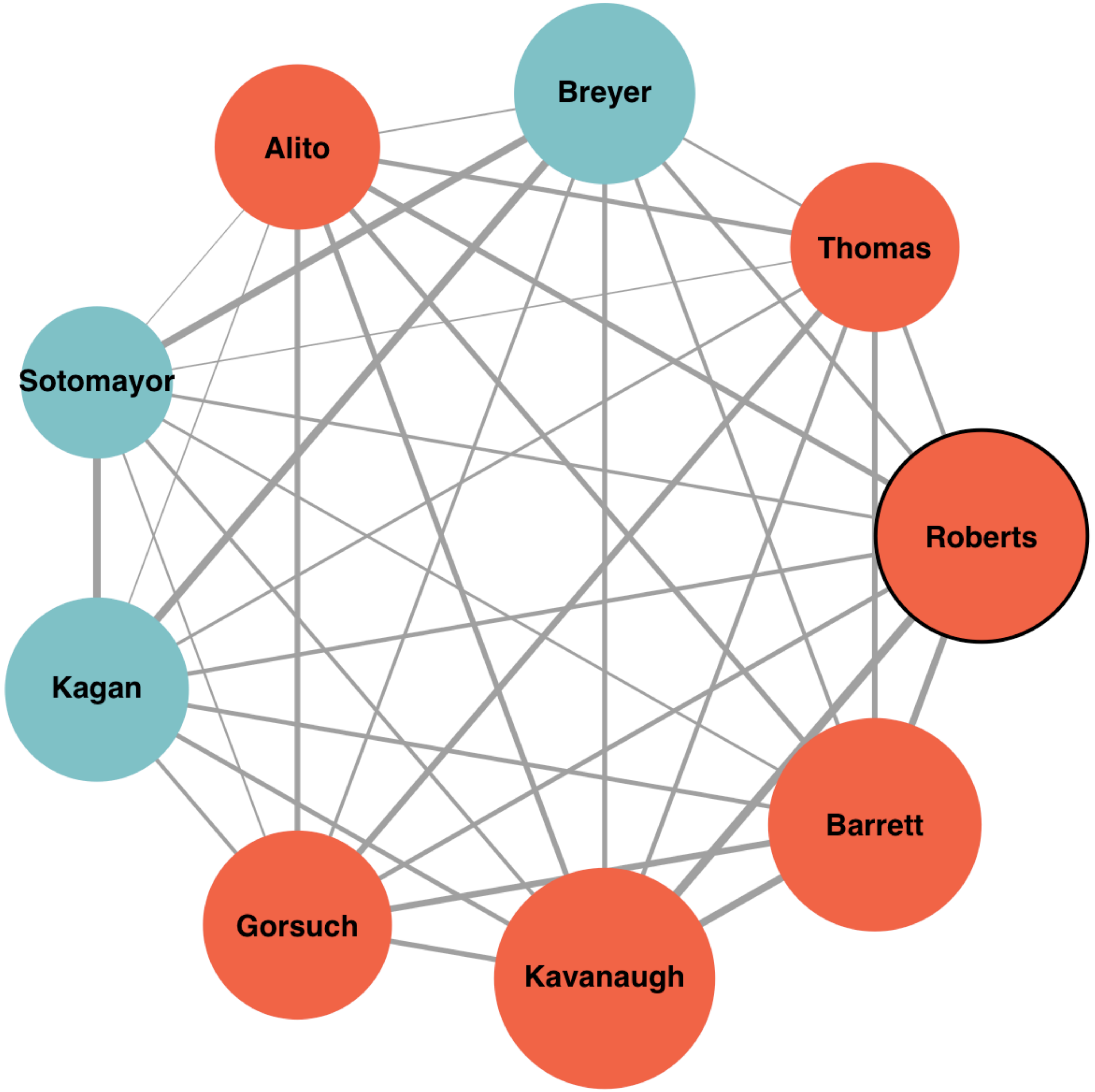
An assortment of network layouts

- We control with the `layout` option within `plot.igraph`





The circle layout

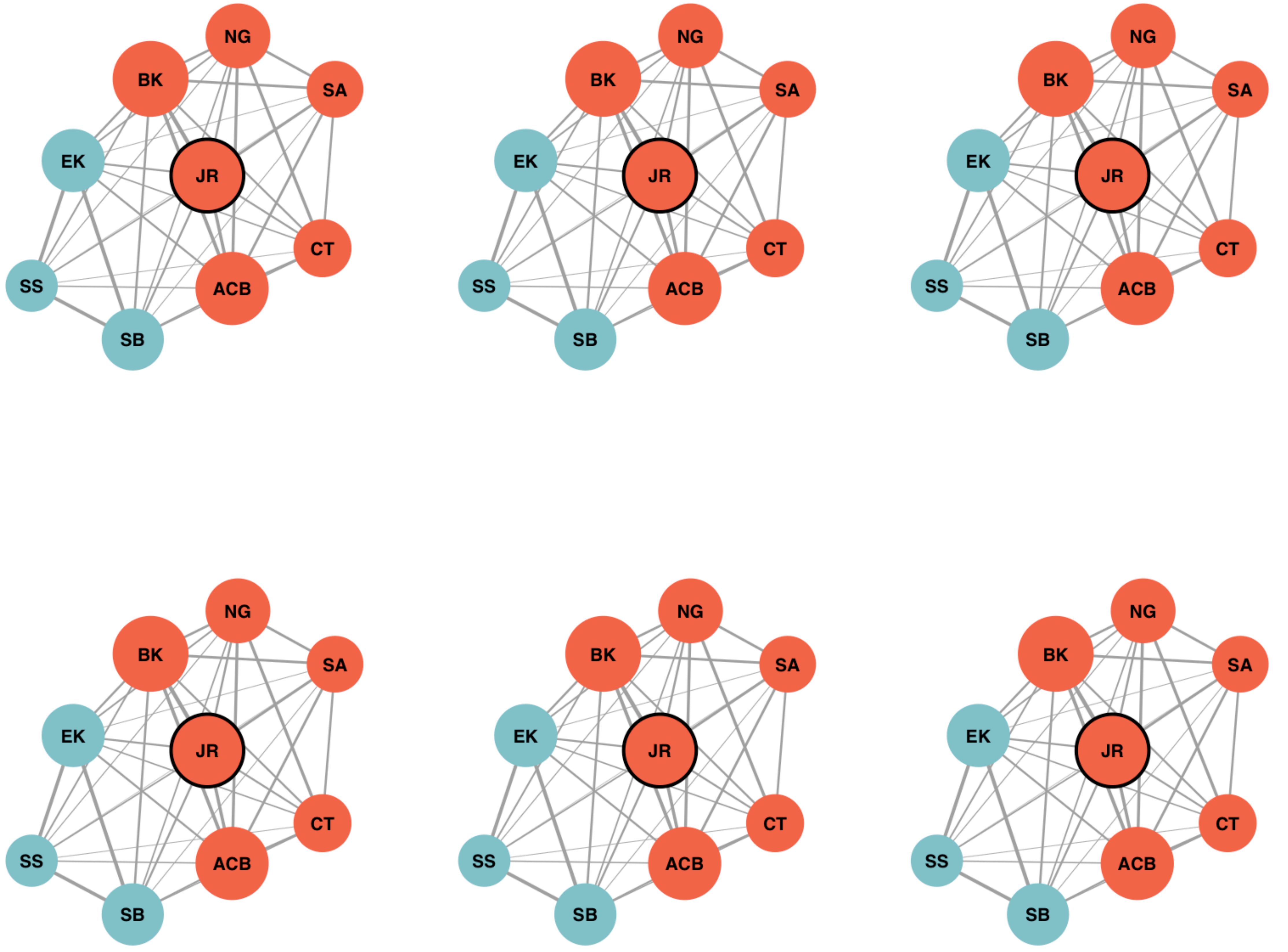



```
plot.igraph(net,
  edge.width=E(net)$weight*5,
  vertex.label=V(net)$justice,
  vertex.label.family="Helvetica",
  vertex.label.font=2,
  vertex.label.color="black",
  vertex.size=V(net)$eigen*50,
  vertex.frame.width=V(net)$width,
  layout=layout_in_circle)
```

Locking in layouts

- We can create and store a particular layout to use if we wish (in this case, a layout linked to tie strength), so that the graph appears the same every time

```
nice_layout <- layout_with_fr(net,
  weights=E(net)$weight)

plot.igraph(net,
  edge.width=E(net)$weight*5,
  vertex.label=V(net)$abbrev,
  vertex.label.family="Helvetica",
  vertex.label.font=2,
  vertex.label.color="black",
  vertex.size=V(net)$eigen*50,
  vertex.frame.width=V(net)$width,
  layout=nice_layout)
```



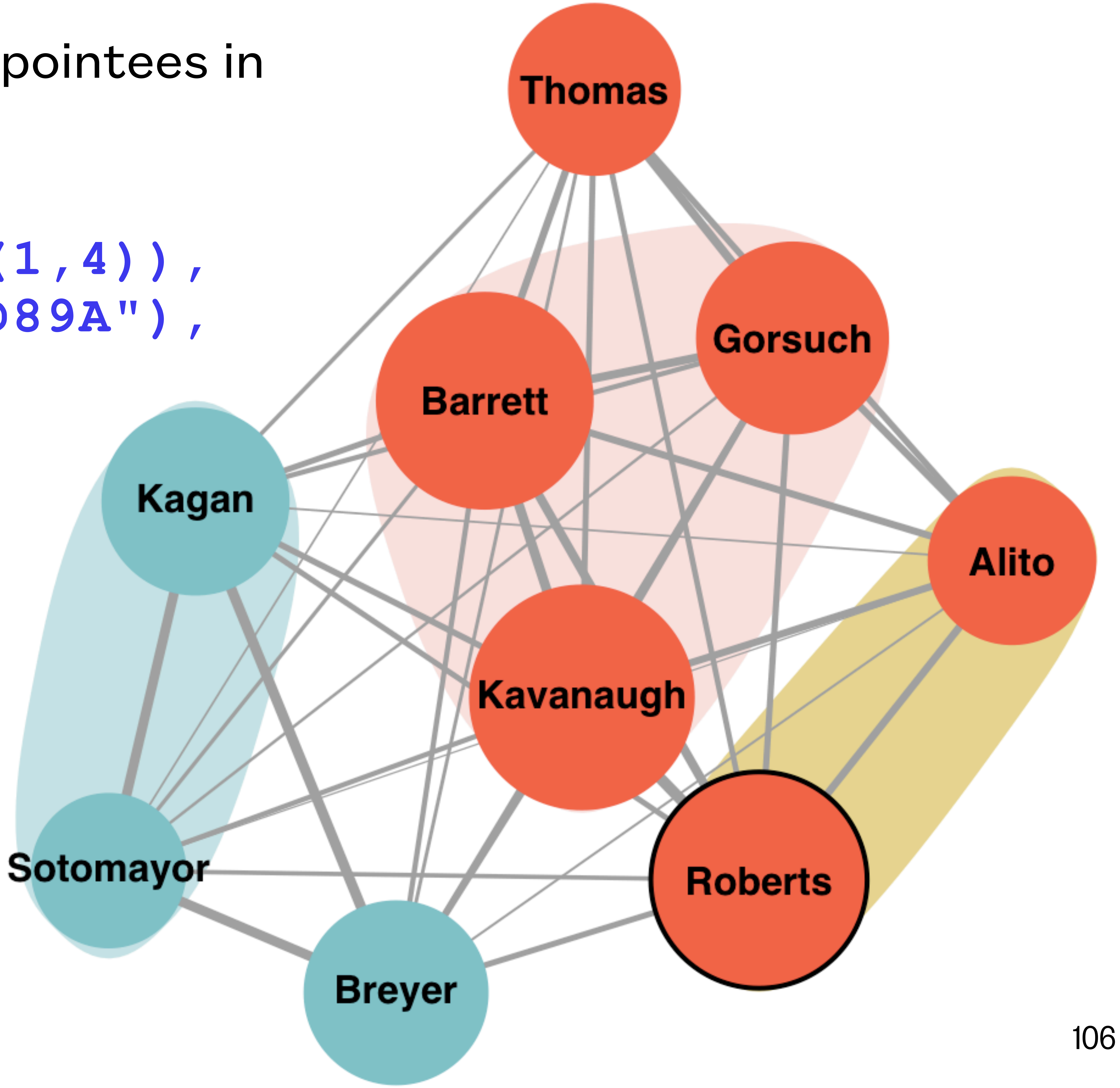
- And can store it to drive for next time

```
write.csv(nice_layout, "layout.csv")
nice_layout <- as.matrix(read.csv("layout.csv"))
```

Highlighting nodes

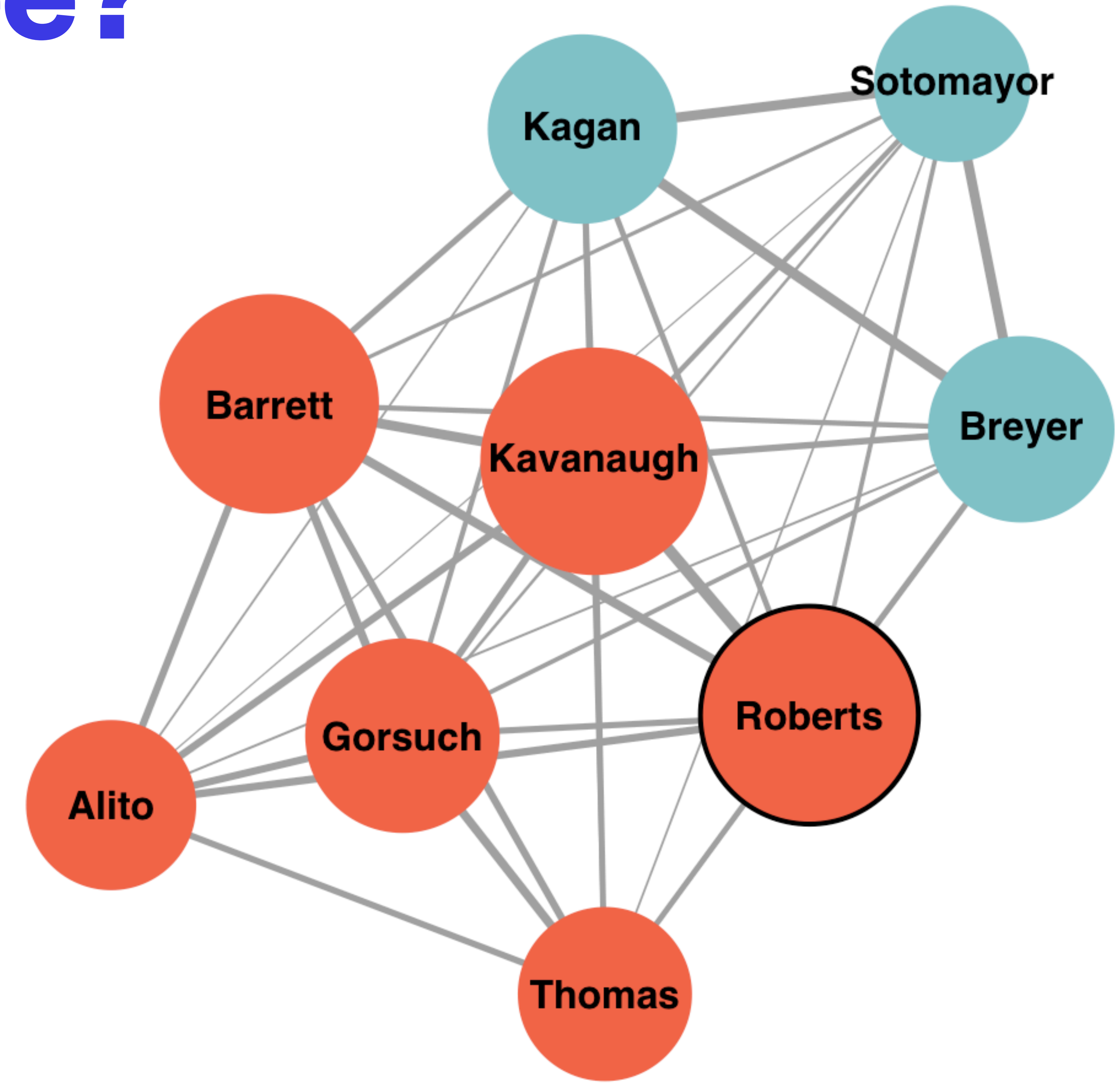
- Here, we highlight Trump, Obama, and Bush Jr. appointees in red, blue, and yellow, respectively.

```
plot.igraph(net,
  mark.groups=list(c(7,8,9), c(5,6), c(1,4)),
  mark.col=c("#FFE4E1","#C5E5E7", "#ECD89A"),
  mark.border=NA,
  edge.width=E(net)$weight*5,
  vertex.label=V(net)$justice,
  vertex.label.family="Helvetica",
  vertex.label.font=2,
  vertex.label.color="black",
  vertex.size=V(net)$eigen*50,
  vertex.frame.width=V(net)$width)
```



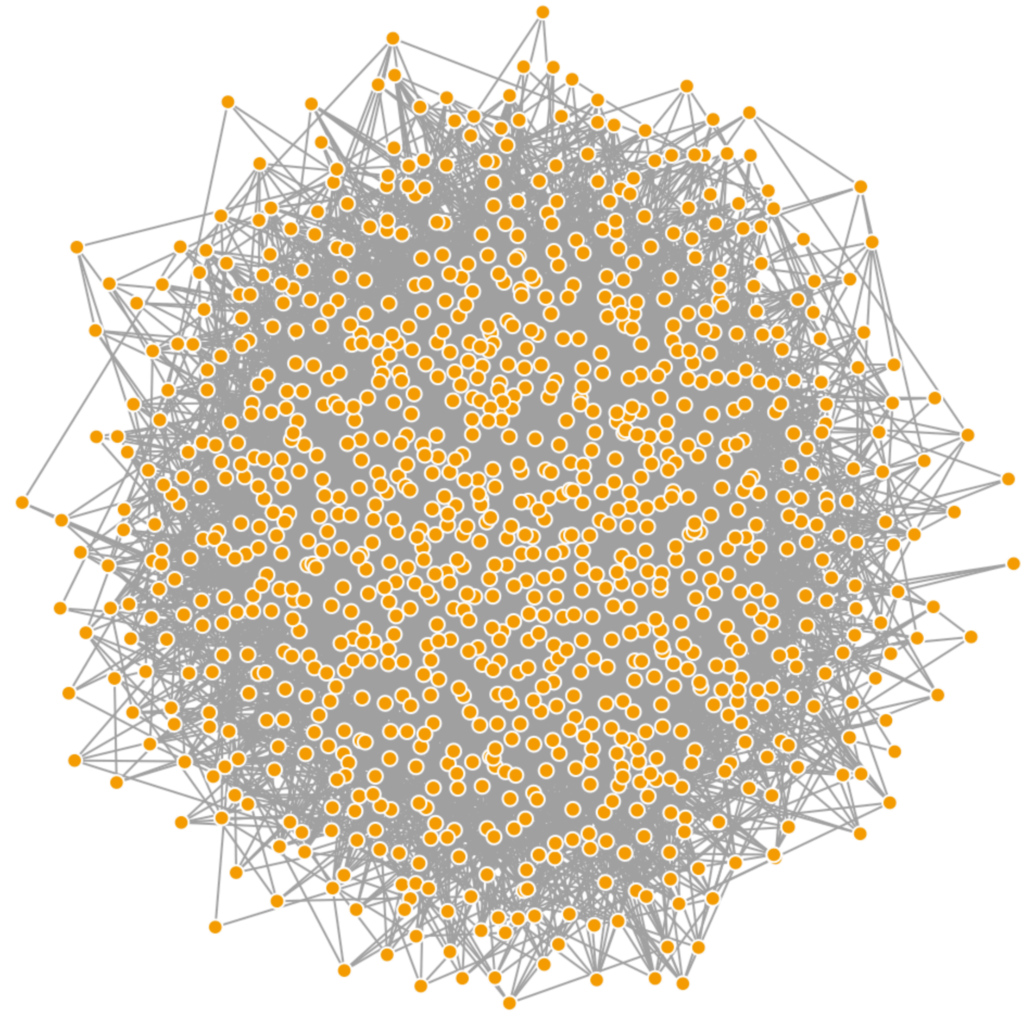
So what can we see?

- *Strong graphics present ready information quickly, at a glance*
  - *While rewarding further inspection with more detail*
- Centrality/importance (node size, graph position from layout tied to edge weights)
- Party (color)
- Tie strength (line width)
- Identities of justices



The example is just an example

- The Supreme Court is a nice (small, simple) network to begin with
- But the techniques here can be used for larger networks just as easily (albeit with things possibly slowing down as the scale and size of your network expands)
    - Larger networks bring different considerations:
        - Smaller (or no!) nodes between links
        - Focus on structure over individual elements
        - Easier to draw “hairballs”



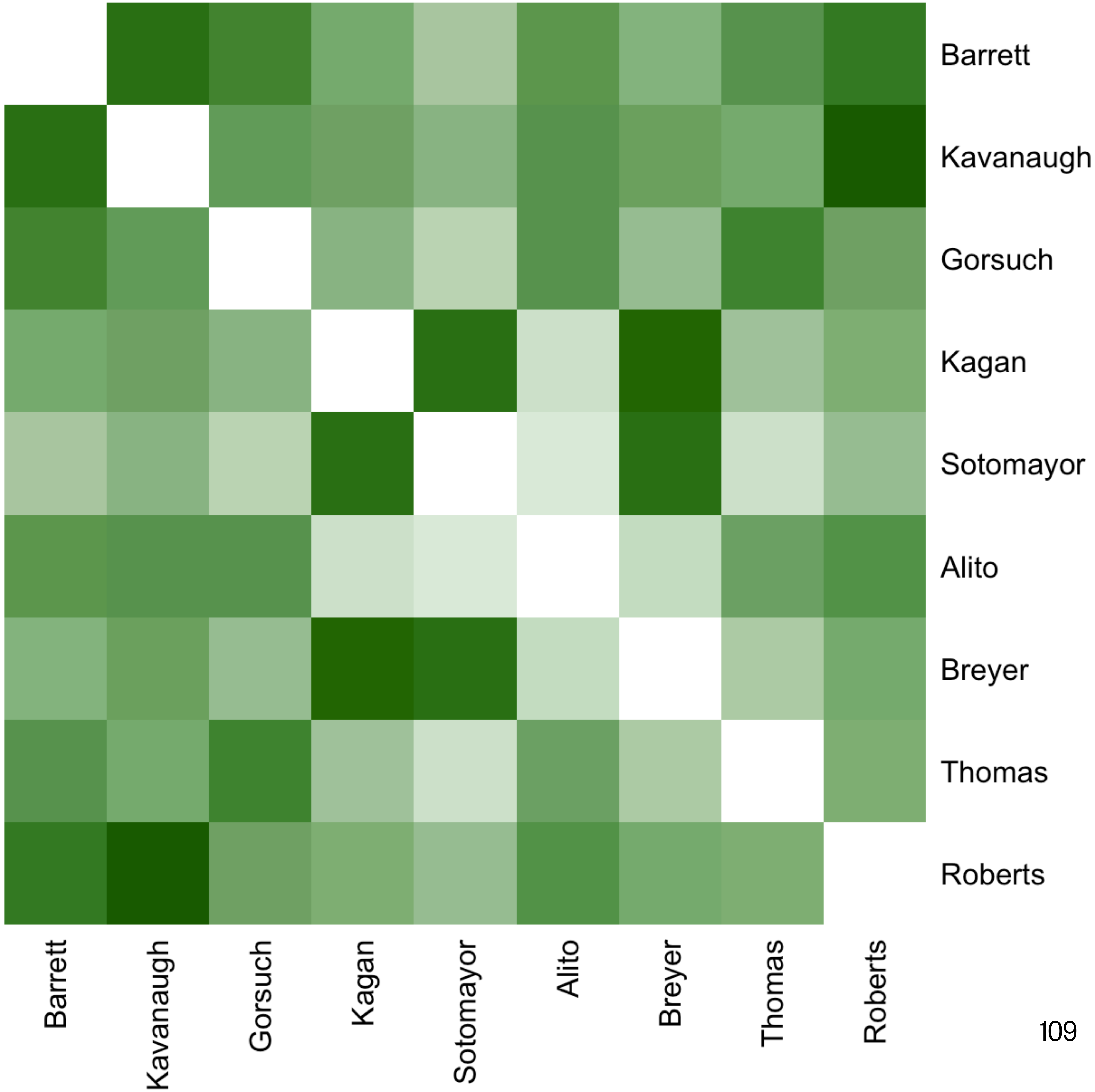
- Also, don’t let yourself be caught by thinking you *must* draw a network with network data

More than one

WAY TO VISUALIZE A NETWORK

- This is a heatmap of network agreement (note that it is symmetrical/undirected)

```
palf <-
  colorRampPalette(
  c("white", "darkgreen"))

netm <- get.adjacency(net,
  attr="weight", sparse=F)

colnames(netm) <- V(net)$justice
rownames(netm) <- V(net)$justice

heatmap(netm, Rowv = NA,
  Colv = NA, col = palf(100),
 scale="none", margins=c(10,10) )
```



Part Four

Wrapping up: where do I go from here?

Alternatives to R

- Programmatic
  - Python’s **NetworkX** library (and iGraph again)
  - Julia’s **JuliaGraphs** library
- GUIs
  - UCI-NET
  - SocNetV
  - Gephi
  - Cytoscape
  - Pajek
  - GraphVis

Resources

- Materials from this lecture (slides, data, code): https://jacklreilly.github.io/networkscrashcourse
- Core references in these slides
  - Ognyanova, K. (2021) Network visualization with R. Retrieved from www.kateto.net/network-visualization.
  - Healy, K. (2018) Data Visualization: A Practical Introduction. Princeton. (Also available: socviz.co.)
- Other books
  - The classic: Wasserman and Faust, 1994. *Social Network Analysis.*
  - The modern classic: Jackson, 2010. *Social and Economic Networks.*
  - For undergraduate courses: Scott, 2017. *Social Network Analysis.*
  - More formal: Menczer, Fortunato, and Davis, 2020. *A First Course in Network Analysis.*

Teaching in context

WHERE DOES THIS FIT?

- Not an exhaustive overview of networks, of course
- Placed in a course, this content would be different in a few ways
  - Interspersed with hands-on R workshops
  - In undergraduate classes, include active learning (with yarn!)
- Where would this fit in a class?
  - This is a more concentrated dose of presentations I do in my current advanced undergraduate course on social networks
  - Normally, it would be divided more (not covering data and visualization together, for one)

Teaching in context

- What would come around this?
  - Depends - social networks exists at the cross-section of methodology and substance
    - In a more substantive course, reading substantive applications goes hand-in-hand with learning core elements of network data, description, and visualization
    - In a more methodologically focused course, this would precede a deeper discussion of proper network analysis: network formation, blockmodels and community detection, contagion and influence, and eventually, models for inference (ERGMs)
    - It might be done with intro to R content at the beginning, as well

Thank you!

Materials: https://jacklreilly.github.io/networkscrashcourse

Contact: jreilly@ncf.edu

Questions?