

# Visually Modeling the Evolution of Political Parties in Dynamic Political Environments

## Creating a Map of Dynamic Political Environments

While studying informal factions derived from roll call data, our team found numerous political environments where politicians frequently changed party affiliation as new parties arose and old ones evolved. This movement was dynamic enough that we could model it as a network flow and visualize it with the re-purposed Sankey Diagram. Here we document the algorithms necessary for manipulating legislator data into a flow network and visually model it with the Sankey Diagram (also called flow chart or swim lane diagram).

*"Legislative politics is unstable without parties" -Susan Stokes*

Name	Party	Type	Start year
John Adams	Federalist	senator	1803
John Adams	Federalist	senator	1805
John Adams	Federalist	senator	1807
John Adams	Whig	representative	1831
John Adams	Anti Masonic	representative	1833
John Adams	Anti Masonic	representative	1835
John Adams	Whig	representative	1837
John Adams	Whig	representative	1839
John Adams	Whig	representative	1841
John Adams	Whig	representative	1843
John Adams	Whig	representative	1845
John Adams	Whig	representative	1847

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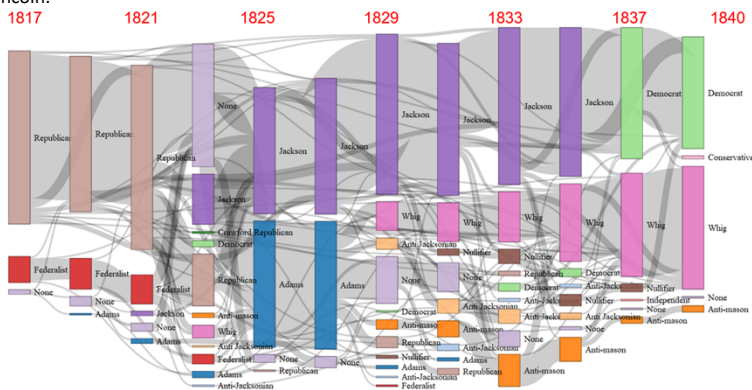
Data: Legislature Data with Name, Party, and Session
Result: Weighted Edge List
for each legislator do
  get ordered list of legislator convocations;
  for each session from 2 to N do
    source[count] = convocation[n-1];
    target[count] = convocation[n];
    value[count] = 1;
    count += 1;
  end
end
for each (source -> target) pair do
  sum value;
end
  
```

Example Legislator Data

Algorithm for Creating Network Flow

## Case Study: American Congress (1815 – 1840)

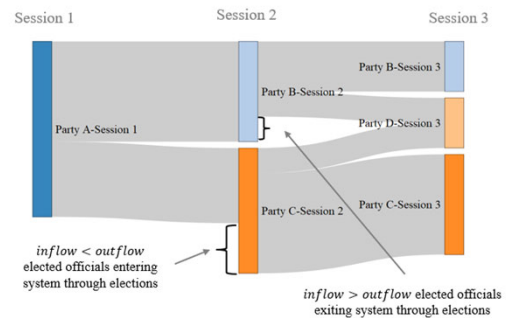
From the early party formation in America we see the dominance of Thomas Jefferson's Republicans, offset by the smaller Federalist party which dwindled after Alexander Hamilton lost a duel. The Republicans were re-energized in the 1820's by Andrew Jackson and rebranded to the Jacksonian Democratic Party (later simply the Democratic Party). We see the Whig Party emerge from anti-Jacksonian factions, creating the *Second Party System*. The Whig Party would eventually become the Republican Party led by Abraham Lincoln.



## Modeling Movement Between Parties as a Flow:

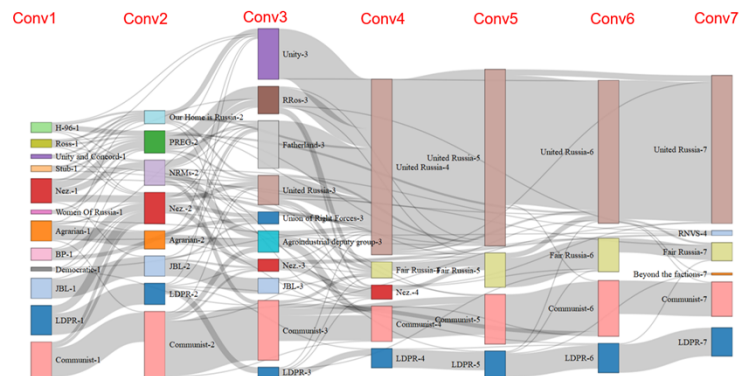
Links represent the number of legislators that move between parties in sessions of their legislative body.  $A1 \rightarrow B2$  is the weighted link that represents the number of legislators that move from Party A in period 1 to Party B in period 2.

Legislative bodies are not closed systems. Elected representatives can enter and exit the system through elections.  $inflow < outflow$  means that a given party gained seats during that session, whereas  $outflow > inflow$  means that a given party lost seats during a given session.



## Case Study: Russian Duma (1993 - Present)

The 1993 Convocation of the Duma was the first election to the Russian Duma since 1907. This era of Russian politics observed the rise and fall of many smaller parties, leading to eventual rise of a single dominant party (the United Russia party). During the 3rd Convocation, the Unity and Fatherland parties merged to form the United Russia party, which consolidated power around Vladimir Putin. This also ushered in the era of single party rule, or what the Russians generally call the "party of power".



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