The Industrial Revolution was one of the most consequential events in human history. From the mass production of goods to the ability to travel faster than a horse can run, mechanization did more to transform how people live their lives in the past 200 years than in the previous 100,000.

We are presently undergoing a similarly transformative revolution—the information revolution. The advent of computers and the internet has turned many aspects of life upside down, including how the nation’s legislatures think about and analyze complex policy problems. More fundamentally, technology has changed how state legislatures are themselves constituted. By introducing software into the once-a-decade redistricting process, adjusting district boundaries has morphed from an imprecise science to a precise art. And the changes are far from over.

As recently as the 1980s, redistricting was done on a massive map laid out on a table (or on the floor) and district borders altered with pencils and markers. Calculators were used to quantify every proposed movement of people from district to district. By the 1990s, software companies had developed geographic information system (GIS) programs that allowed users to visualize geographic and demographic data digitally for the first time. Workstations using massive computers programmed with this software were available to states that could afford them. In 2000, both hardware and software had advanced to the point that redistricting could be done on a desktop computer. And in the last redistricting cycle, redistricting software could be stored on a laptop with data accessible via cloud computing.

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**Did You Know?**
- Redistricting is the process of redrawing state legislative and congressional district boundaries in order to comply with the Supreme Court’s “one person/one vote” doctrine.
- Nearly all redistricting is done using software developed by private companies, although publicly available software is becoming more common.
- Geographic information systems (GIS) not only help with redistricting, but can play a critical role in the administration of elections.
Anyone with an internet connection and a web browser will be able to try his or her hand at redrawing district lines. States could facilitate this process by setting up a web-based public input tool of their own.

Each of these changes had a transformative effect on how redistricting occurred. The workstation automated the process for the first time, speeding up the line-drawing process tremendously. The desktop made redistricting much more accessible, by letting anyone with a personal computer draw lines themselves (if they had the software). In the 2010s, redistricting on laptops meant those drawing the lines could travel with their program to outlying areas, where more voices could be heard in the line-drawing process.

In this decade, the growth of cloud-based redistricting products will mean that locally stored redistricting software is no longer required to have a say in the process. This means that anyone with an internet connection and a web browser will be able to try his or her hand at redrawing district lines. States could facilitate this process by setting up a web-based public input tool of their own. Regardless of whether states offer this service, legislatures and commissions will likely receive unsolicited maps created in open-source tools.

The full effects of these technological innovations will not be known until after the upcoming redistricting cycle has concluded. What we do know is that 10 years from now, new and unforeseen innovations will alter our understanding of redistricting once again.

State Action

While changes in GIS are the most significant evolution—some might say revolution—in redistricting technology, they are not the only innovations. The inputs into that software (data) and the end use of the software (by legislatures and the public) are also significant. States are using technology to support their redistricting responsibilities in novel ways, including:

Colorado, as part of its recently adopted redistricting commissions, will permit commissioners to join public hearings via videoconferencing. A nod to the state’s rugged geography and unpredictable weather, permitting commissioners to participate using this technology increases the likelihood that a quorum of commissioners will be present at public hearings. This in turn increases the number of opportunities for members of the public to have their thoughts heard by the full commission.

Indiana is partnering with universities and private foundations to create and publish redistricting data resources online. The joint project, known as Stats Indiana, enables Hoosiers to download districts in multiple formats and read profiles with statistics about their own districts. They can also see the results of nationwide reapportionment in Congress to compare Indiana to its peers and find information about local redistricting in various counties.

New Jersey adopted the Voting Precinct Transparency Act in 2019, which requires the state to publish electoral boundary information in a commonly used GIS format. Additionally, election results that are matched to those boundaries must be published online within 90 days of any election certification. When the election results and the electoral boundary information are combined, any user—legislators and staffers, industry, the public, etc.—can instantly analyze a state’s political geography. Such analyses are necessary to comply with laws such as the Voting Rights Act, but can serve other functions. Publicly publishing this information boosts transparency in redistricting by empowering any citizen to have the data needed to participate in the redistricting process.

Utah has long been a leader in public input for redistricting. In the last redistricting cycle, it partnered with Esri to create a web-based portal through which Utahns could submit proposed redistricting plans to the legislature for consideration. In fact, a publicly designed map was adopted by the legislature for the state board of education.

Federal Action

The census is by far the most notable event using redistricting technology at the federal level. The Census Bureau is collecting data this year with new technology and the 2020 census will be the first in the nation’s history to be conducted primarily online. If the bureau fails to receive a response online or by phone from a particular residence, an enumerator will go to the home to gather the data in person. Enumerators will record the data electronically on hand-held devices.