The System That Actually Worked

How the internet kept running even as society closed down around it

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Coronavirus Pandemic

Industries / Telecommunications

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Take-Aways

- During the pandemic, the internet became the vital infrastructure holding social and economic life together and providing a "semblance of normalcy."
- Today's internet derives from the ARPANET, originally designed to stay "unbreakable" even through nuclear war.
- The cloud enables the bulk of email services like Gmail and Slack communication, as well as easy access to private and public databases.
- The COVID-19 pandemic exposes the vulnerability of over-optimized systems.

Recommendation

In the coronavirus pandemic, the internet became the overarching infrastructure that kept social and economic life possible. The web's architects built it with redundancy in mind, which is why it's so robust, with multiple ways to route every communication. Recent innovations like cloud storage make it a snap to add capacity. Writing for *The Atlantic*, journalist Charles Fishman analyzes the impact of COVID-19 on internet use for provider AT&T. From video meetings and classrooms to news and online shopping, the internet is, indeed, the web holding the world together.

Summary

During the pandemic, the internet became the vital infrastructure holding social and economic life together and providing a "semblance of normalcy."

People have been able to stay home, study at home and work from home during the COVID-19 pandemic largely because of the internet. Internet provider AT&T saw an immediate uptick of 20% in its network's usage in mid-March 2020, then another 5% surge from April on, with no decrease as of May.

Adding that capacity quickly might not sound like such a challenge, but the trucking industry, for example, couldn't do it, and neither could the airline industry. The whole world relies on the internet for widely diverse functions, such as keeping businesses open remotely, staying in touch with friends and family, offering online work and education, and communicating news and vital medical information.

AT&T is the largest telecom corporation in the United States, with revenue of $181 billion and a quarter of a million employees. As the third largest broadband carrier, after Comcast and Charter Communications, it is one of the companies that manages the "internet backbone" across America, Europe and Asia.

> *"In the pre-pandemic world, weekdays on the internet were pretty placid. Most of the normal routines of work are undemanding for the network: emails, Slack messages, loading websites, sharing files."*

Before the pandemic, 9 p.m. was crunch time for the internet. That's when people settle in to watch bandwidth-demanding streaming video services, such as Netflix, with its 60 million subscribers, Hulu, Amazon Prime and the rest. Traffic usually peaked on Sunday nights.

Then, on March 16, 2020, AT&T sent 90,000 employees home to work remotely. Many other companies also sent their workers home. From that day onward, ordinary weekday web traffic came to resemble pre-pandemic Sunday nights.

As people stayed in touch with each other via videoconferencing services such as Skype and Zoom, AT&T saw a fivefold increase in audio and video use. However, residential Wi-Fi connections are less robust than those in downtown offices – which are geared for speed – so internet demand suddenly surged in places that were not built for heavy traffic.

Today's internet derives from the ARPANET, originally designed to stay "unbreakable" even through nuclear war.

AT&T explains that it has 134 ways to connect you on its network. The web works by connections. It is like a road system, with large interstates, internal highways and smaller, residential-speed roads.

> *"Having many paths to any given destination is part of the internet's original design, a characteristic that's been retained as the network has expanded. It's much of what gives the internet its adaptability and resilience."*

That "last mile" of fiber optic cable that reaches homes lacks a built-in design for speed – which internet highways have. The at-home network has less systemic flexibility, like residential side streets or local electricity delivery.

The cloud enables the bulk of email services like Gmail and Slack communication, as well as easy access to private and public databases.

Google, IBM and others hubs store internet data in immense data centers, not, for instance, at your company's offices. The cloud and its redundancy of connections enable smooth internet function; it enables people to work from anywhere.

AT&T engineers reroute connections in case of emergencies so customers stay connected without business disruptions, although automation handles most routine traffic routing. Usually, AT&T employees at its Global Technology Operations Center keep a real-time eye on the network and the internet, monitoring weather and news for potential disruptions. Now many of those employees are monitoring the internet from their homes. And, now, disruptions are more likely to come from residential areas, not downtown office hubs. Local traffic is the new "business level."

> *"In just a few weeks, AT&T has accommodated more new traffic every day than its total daily traffic six years ago."*

This geographical shift spurred AT&T to add more fiber connections in areas of quickly growing demand. "Uptime," the ability of the internet to stay on, no matter what, and to add capacity and stay nimble, is a selling point for broadband providers. This trait characterizes the internet, so much so that electrical grids and airlines, for example, manage their critical operations through it.

The COVID-19 pandemic exposes the vulnerability of over-optimized systems.

Currently, both intensive care hospital beds and swabs to take samples for COVID-19 tests are in dangerously short supply – as is baker's yeast – because the prevailing economic philosophy for decades called for reducing "waste" by maintaining a just-in-time supply chain.

> *"What has saved the internet – redundancy, flexibility, excess capacity – reflects not just a different design philosophy, but a different underlying economic philosophy as well."*

The internet has physical aspects, and AT&T and other carriers must maintain that infrastructure. Whatever happens, the company must maintain internet lines, including 485,000 miles of cable under the ocean and 1.3 million miles of cable underground; 80,000 cellphone stations; and many hundreds of switching locations. It employs 100,000 technicians to oversee equipment replacement and maintain seamless service for businesses like hospitals. In handling the COVID-19 pandemic, AT&T set up stations at test sites to ensure robust service. It maintains warehouses of emergency equipment, like mobile cell towers, miscellaneous spare parts, drones and even Meals Ready-to-Eat so its employees have what they need to navigate disaster, to restore service when necessary, and to keep the network up and running. To that end, AT&T also conducts periodic exercises to prepare for disasters; in May, 2019, it even simulated a pandemic.

Now, although internet demand is up, the real pandemic hit AT&T's business hard. It had to close 60% of its retail outlets and, in April, 2020, it estimated that 20,000 employees were either sick or vulnerable to getting sick, or taking care of a loved one who was sick. The company waived certain fees and scuttled a $4 billion stock buy to save cash. AT&T reports that it takes its mission seriously, and now it's focusing on keeping people connected and the economy going.

Even where the office buildings are still quiet, the internet is bustling.

About the Author

Charles Fishman is the author of *The Wal-Mart Effect* and *One Giant Leap: The Impossible Mission That Flew Us to the Moon,* and he co-authored *A Curious Mind: The Secret of a Bigger Life* with Brian Grazer.

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