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BROADBAND 101: THE BASICS OF BROADBAND INFRASTRUCTURE

Broadband is shorthand for the physical infrastructure of the internet. Like other utilities (water and electricity) there are several layers of infrastructure required to deliver service to households and businesses. Flicking a lightswitch or turning a faucet relies on wires and pipes stretching from inside the house, through the neighborhood, city, County, and well beyond. In the same way, connecting to the internet - whether on a computer, a cell phone, or through any of a growing number of connected devices like smart thermostats - broadband infrastructure stretches from inside the home to across the country, and around the world. Simplified, broadband relies on backbone, middle mile, and last mile infrastructure:[1]

- Backbone/Long Haul - *massive networks with national and major regional reach. The networks run to buildings that act as exchange points, where data is passed between and across regional and local networks and providers. These are typically located in the larger metropolitan areas, including One Wilshire in downtown Los Angeles.*
- Middle Mile - *high-capacity fiber-optic cables that traverse long distances (e.g., 10s-100s of miles) to connect communities to the Internet backbone. These high-capacity lines are analogous to transmission lines for electric utilities, or aqueducts and rivers for water utilities.*

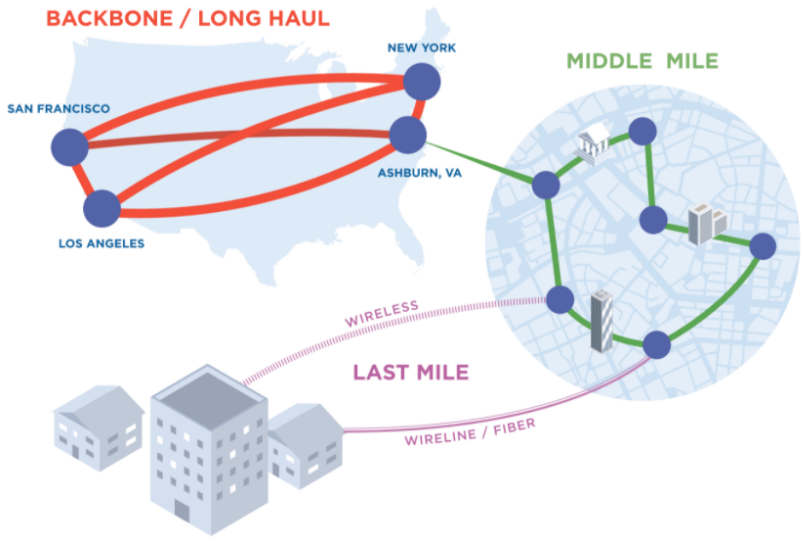

Illustration source: If We Build It, Will They Come? Lessons from Open-Access, Middle-Mile Networks https://www.benton.org/sites/default/files/OAMM_networks.pdf

- Last Mile - *cables or wireless bandwidth that connect individual addresses to the nearest utility poles or towers which connect communities to the middle mile.*

[1] If We Build It, Will They Come? Lessons from Open-Access, Middle-Mile Networks | Benton

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Broadband can be "wired" or "wireless," with several types in each category:

Wired

- ➔ DSL - oldest, slowest, least reliable
- ➔ Cable - most common, can be fast + reliable
- ➔ Fiber - newest, fastest, highest capacity and most reliable

Wireless

- ➔ Fixed - stationary connection between two relatively close towers
- ➔ Mobile - connection through cellular towers
- ➔ Satellite - low-Earth orbit satellites that connect to fiber-optic middle-mile infrastructure[2]

Fast Facts:

➔ Fiber or (fiber-optic) is the newest, fastest, and most reliable broadband type.[3]

Fiber is exponentially faster and more reliable, with more capacity to accommodate growing data needs, than other infrastructure types. Fiber is not available to most American households, and remains extremely rare in low-income communities - an artifact of digital redlining.[4] A recent study of AT&T's investment in upgrades to fiber in California found that "initial fiber-to-the-home deployment is disproportionately focused on high-income communities."[5] The study found that the concentration of broadband investment in wealthy communities was worst in Los Angeles County, where the median household income for households benefiting from fiber-to-the-home upgrades was nearly double that of the households left in the slow lane.

➔ 16% of California households and 19% of LA County households are unconnected or under-connected.[6]

Primarily due to affordability, 1 in 10 households in LA County have no broadband access, and nearly another 1 in 10 are under-connected, relying on a mobile phone only to access the internet. Most Americans use cable broadband to access the internet via a national internet

[2] How Do SpaceX's Starlink Satellites Actually Work? | Discover Magazine
[3] The Case for Fiber to the Home, Today: Why Fiber is a Superior Medium for 21st Century Broadband | Electronic Frontier Foundation
[4] Digital Redlining 101 | CCF Digital Equity Initiative
[5] AT&T's Digital Divide in California | Berkeley Haas Institute
[6] Statewide Survey on Broadband Adoption 2021 | USC for CETF

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service provider (ISP). Cable is often the only high-speed option available, and it typically comes with an expensive monthly bill.

➔ The Federal Communications Commission (FCC) defines the minimum speeds as 25/3 for internet access to qualify as "broadband."

Since 2015, the FCC's minimum broadband speed threshold has been 25 megabits per second for downloading files, and 3 megabits per second for uploading.

- Download speed - *how quickly your Internet connection can retrieve data from the Internet*
- Upload speed - *how quickly your Internet connection can send data from your devices to the internet*

Many argue the FCC's threshold is far too low. Households of 3+ people require faster speeds to use everyday applications like video chat. According to Broadband Now, "Internet speeds in the 100–200 Mbps range is ideal for most households since they can handle common uses like streaming and video chat for 2–5 users at once."[7]

➔ Historic investments in broadband infrastructure are underway at the local, state, and federal levels. Action is needed to ensure those investments help close the digital divide, rather than doubling down on the systems that created widespread digital inequities.

Examples of recent policy making in this space:

- Federal: The American Rescue Plan allotted money to local and state governments to support broadband investment. The federal Affordable Connectivity Plan is a subsidy program providing for up to $30 for eligible households to apply to broadband (wired or mobile) subscriptions. This program is run through ISPs.

- State: In 2021, Governor Newsom signed Senate Bill 156 into law, allocating $3.25 billion to build, operate and maintain an open access, public middle mile network and $2 billion for last mile connections, split equally between urban and rural counties. The California Department of Technology (CDT) has begun the process for establishing the "Golden State Network" - the state's middle mile - and the CPUC is setting the rules and procedures for the last mile funding.

[7] What is a Good Internet Speed? A Guide to How Much You Need | BroadbandNow.com

- Local - Los Angeles: The Los Angeles County Board of Supervisors passed an Investments to Accelerate Digital Equity motion, which will initiate creation of a municipal community wireless network that will offer free broadband to the County's least served residents and begin the planning process for county-driven broadband fiber-to-the-home network.

About the CCF Digital Equity Initiative

The Digital Equity Initiative is a multi-year project of the California Community Foundation that will seed a digital equity movement in Los Angeles County with the power and capacity to successfully advocate for systems-change solutions that provide for fast, reliable, and affordable broadband for all Angelenos. While all aspects of digital equity are critical, The CCF Digital Equity Initiative is not at present focused on digital literacy or devices. Our efforts are centered on empowering and building capacity within affected communities to fight for and win equitable access to broadband that will make literacy and devices most useful.

For more information, email digitaldivide@calfund.org, or call Shayna Englin at 323.217.3565.