

Digital Inclusion 101

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What the Research Says

- **Broadband DOES matter for a whole host of social & economic outcomes!**
 - **Household income**
 - **Employment levels**
 - **Firm attraction**
 - **Farm profits**
 - **Civic engagement**
 - **Increased housing values**
- **Adoption is (arguably) more important than simple availability**
- **The extent to which *very fast* speeds matter is TBD...**



What is Digital Inclusion?

Refers to the adoption of broadband technologies and its meaningful use for social and economic benefits.

Source: [Community Developments Investments Magazine, November 2018](#)

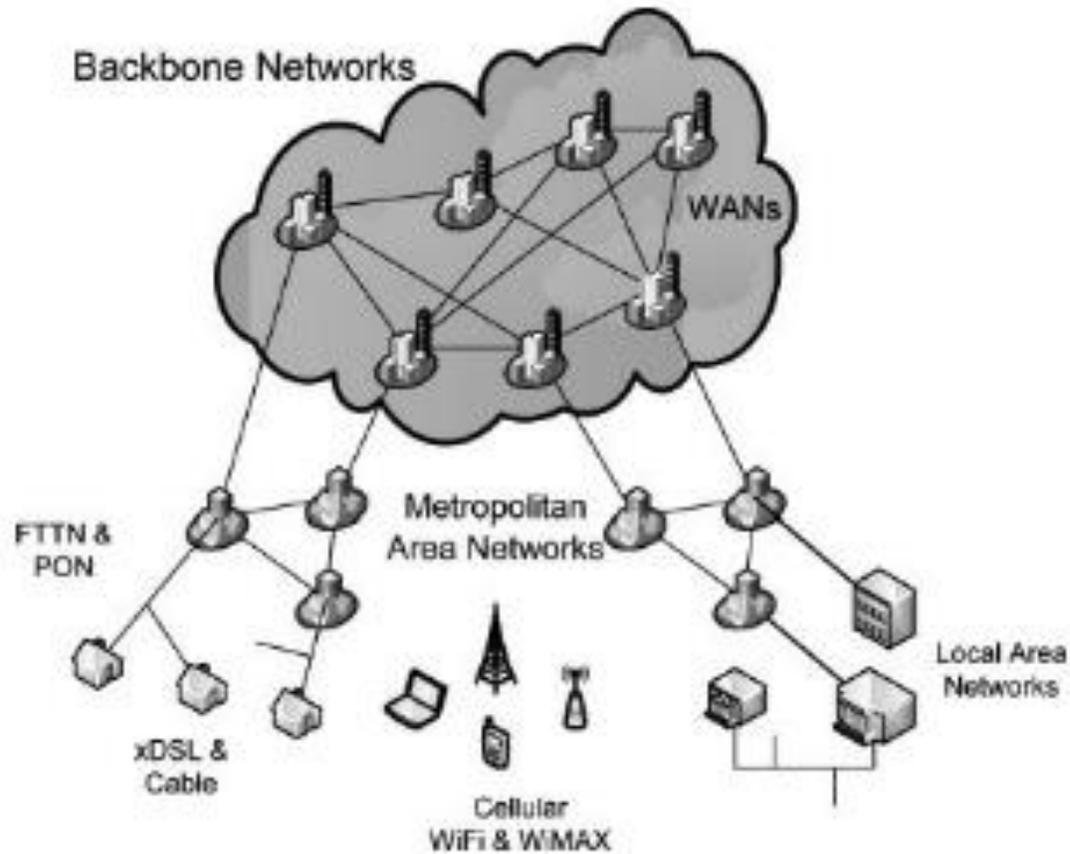


First-level divide: access yes/no

Second-level divide: differences in internet use

Third-level divide: economic, cultural, social, & personal outcomes

A network within a network



Source: Grubescic & Mack (2016). Broadband Telecommunications and Regional Development

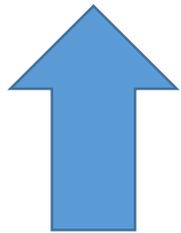
Defining Broadband

- **Internet access that is always on and faster than dial-up**
- **Different technologies, different speeds**
- **Download: 25 Mbps**
- **Upload: 3 Mbps**
- **25/3 for short**
- **Symmetric: comparable upload/download speeds**
- **QoS: Quality of service**

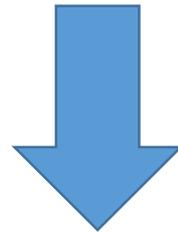


Asymmetrical speeds ...

**... is like using a dirt-road heading one way
and coming back using a multi-lane highway**



Dirt road



Multi-lane highway

Broadband Deployment Models

- **Private sector**
 - Large providers; WISPs; Telephone/Cable
- **Public-private partnership (P3)**
 - Ammon, Idaho
 - South Bend, Indiana
- **Municipal**
 - Nashville, Tennessee
- **Co-operatives**
 - Minnesota



Broadband Technologies

- **Digital Subscriber Line (DSL; xDSL;)**
 - **Cable Modem (HFC: hybrid fiber-coaxial)**
 - **Fiber-optic**
 - **Fixed Wireless**
 - **Satellite; Low earth orbit (LEO)**
 - **Broadband over Power Line (BPL)**
-
- **Fixed Versus Mobile**



DSL Vs. Fiber data carrying capacity...



2-inch pipe



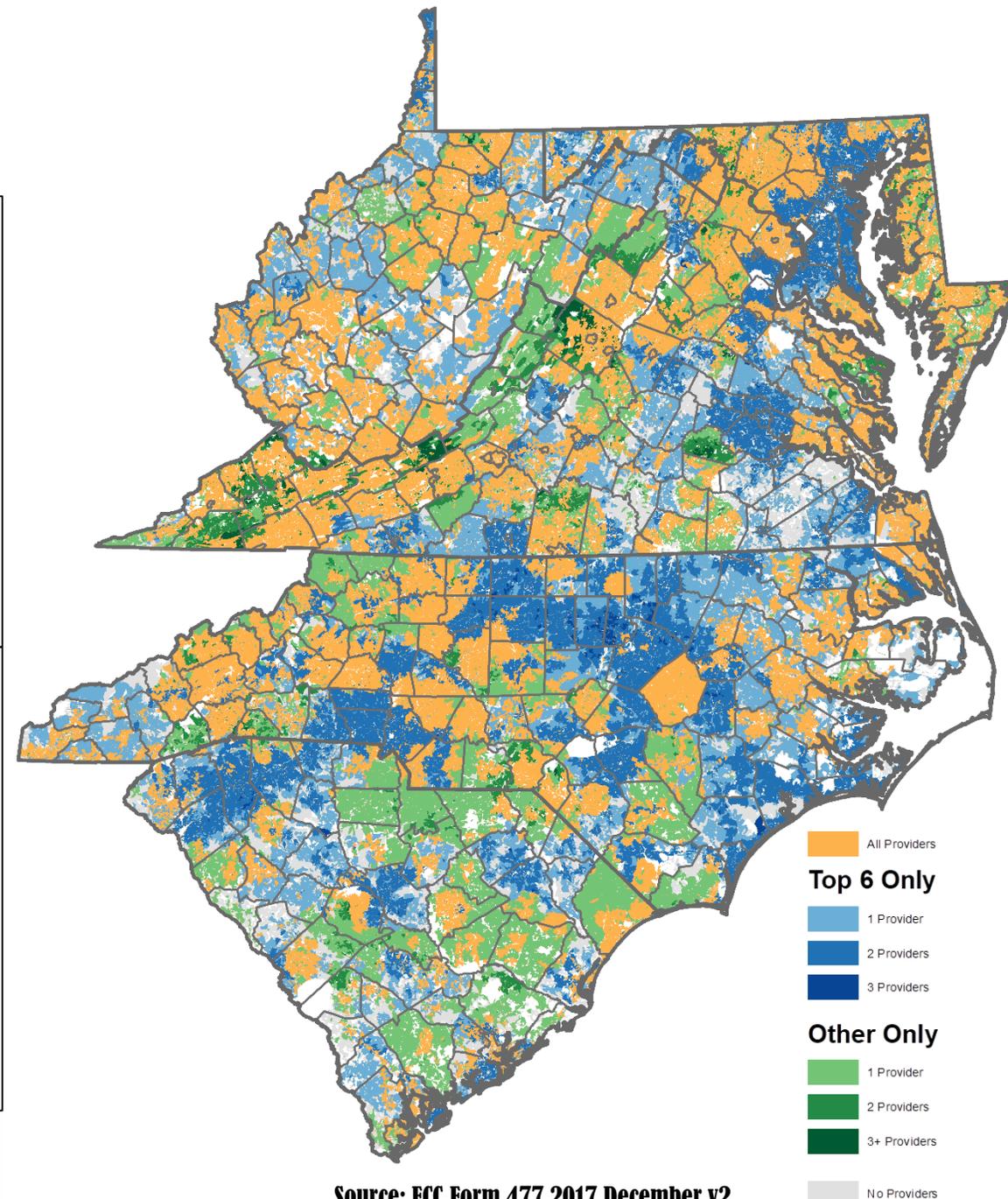
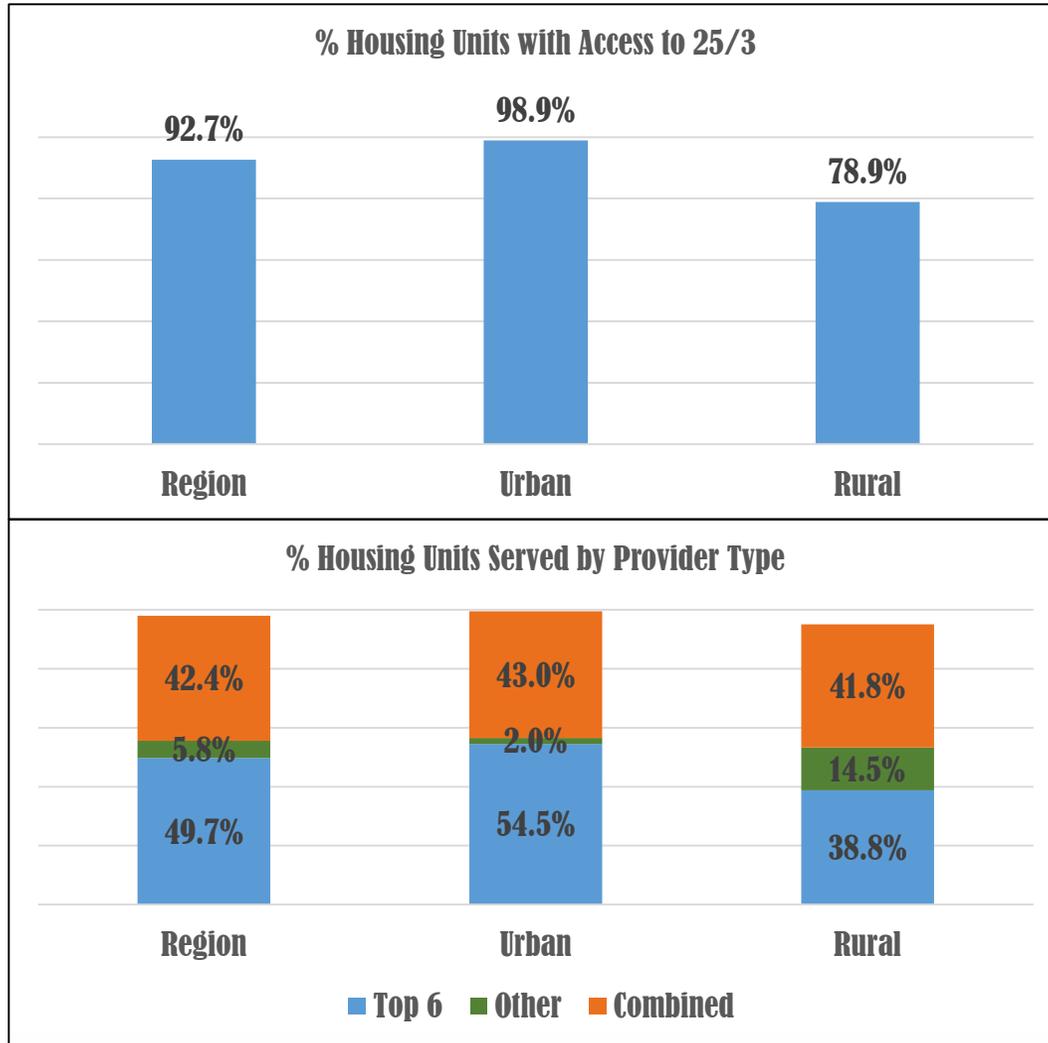
15-mile wide river

Infrastructure Barriers

- **Lack of leadership**
- **Lack of expertise**
- **Lack of density/ROI inexistent**
- **Right-of-ways**
- **Easements**
- **Topography**



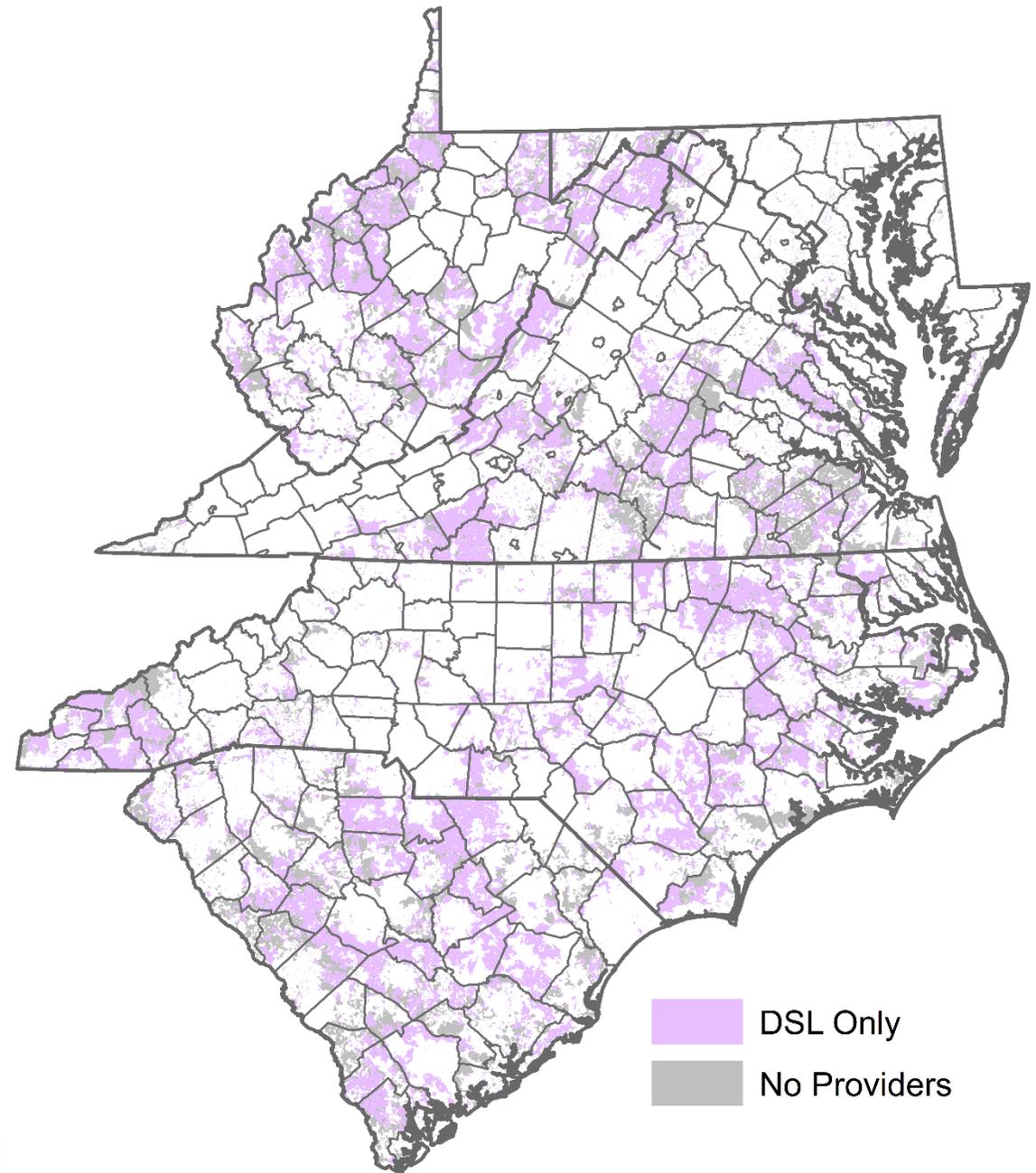
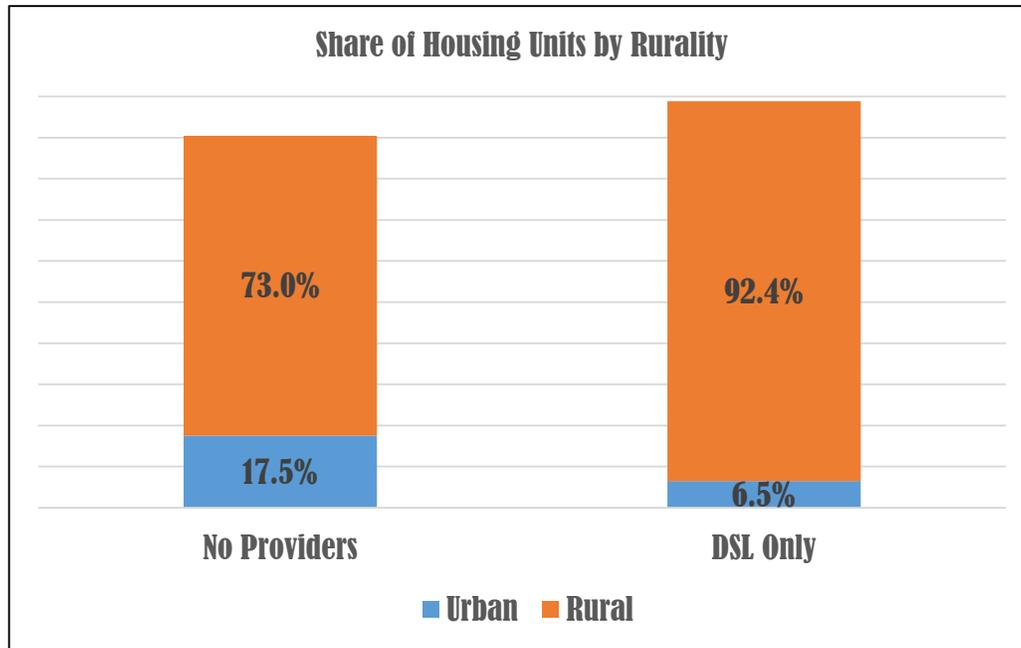
Broadband Access



Broadband Access

Housing Units

- **No Providers: 276,135 (2%)**
- **DSL Only: 662,233 (4.8%)**



Advertised Median Speeds in Mbps & Percent Housing Units served

	Region		Urban		Rural	
	Download	Upload	Download	Upload	Download	Upload
DSL	12	1	15	1	10	1
	86.0%		88.2%		82.2%	
Fixed Wireless	15	4	15	4	15	3
	18.1%		15.2%		24.9%	
Cable	300	20	400	30	300	20
	88.6%		98.2%		67.4%	
Fiber-optic	940	880	940	880	1,000	50
	37.3%		46.5%		16.3%	

Source: FCC Form 477 2017 December v2