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Innovation meets the access network

The Future of the ILEC?

An Alternative ILEC Transformation

October 2017

Agenda

- State of The U.S. Broadband Market
- Alternative Future of an ILEC

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State of US Broadband Market

The U.S. Broadband is a stalemated game of RISK©

They won't upgrade there, so I won't have to. I'll buy more content companies and go to DOCSIS 3.1 and spend more on lobbying

COMCAST

I'll upgrade the least I can so I can digest Time-Warner and buy more content assets and I'll leverage DirectTV to target MDU's out of region

at&t

Charter Spectrum

A little DOCSIS 3.1 and a few node splits buys me a decade. I'll only upgrade where I have fiber competition .

I'll upgrade Boston and Sacramento and I'll tell them I'm going to upgrade everywhere so no one else does (Over-builder). I like wireless better anyway.

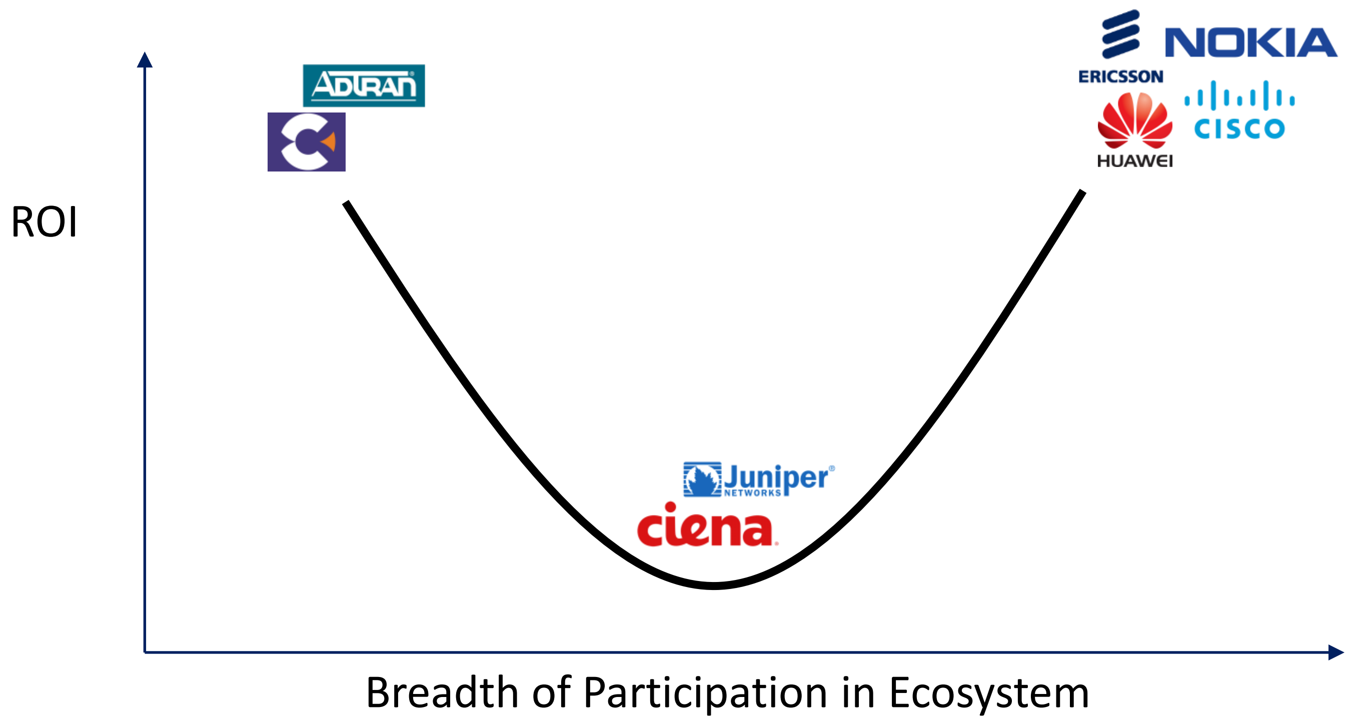
verizon

CenturyLink

Frontier

I'll do what it takes to get bought.

Quick Lesson From Innovation: Vendors



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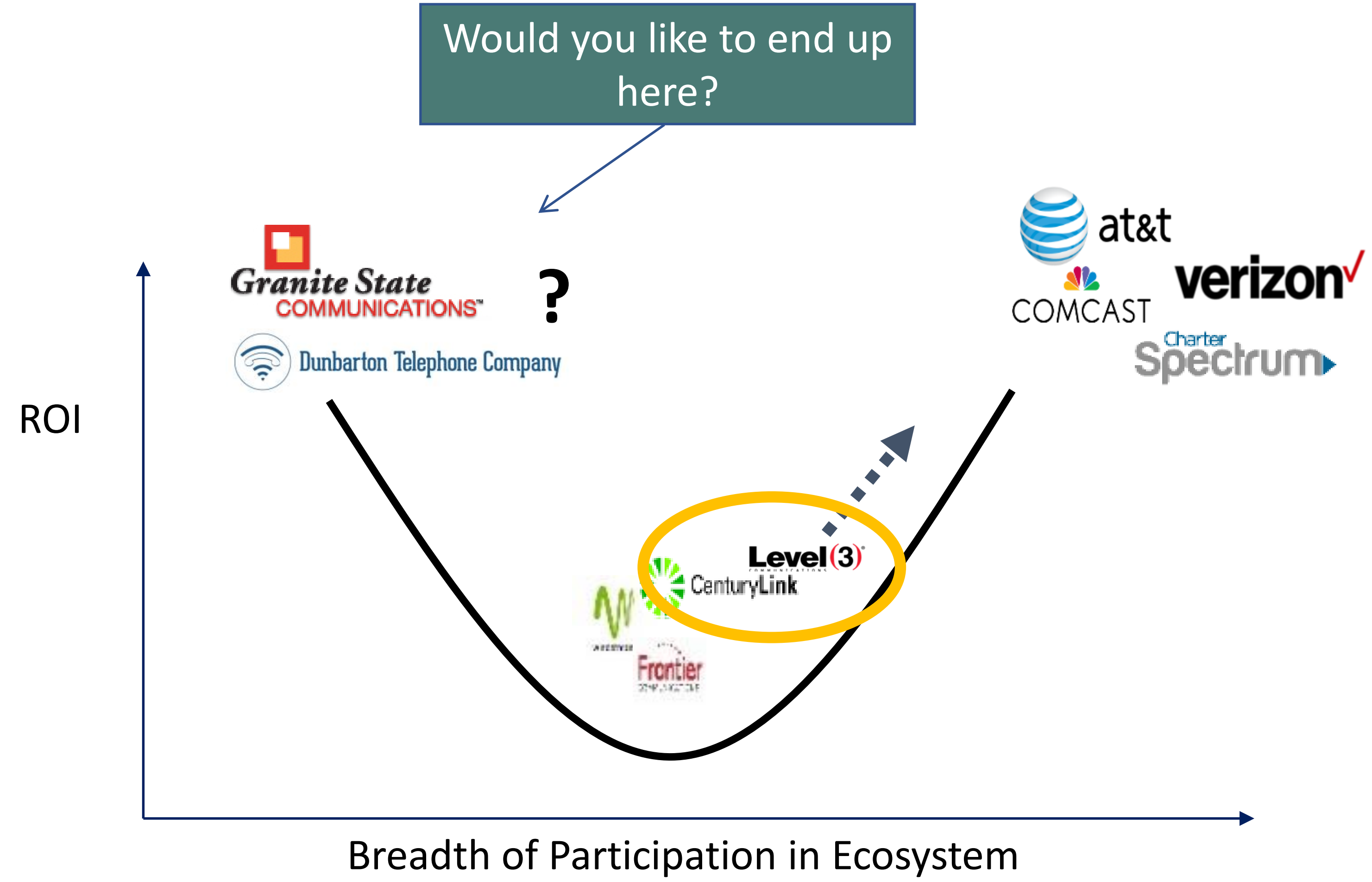
Quick Lesson From Innovation: Incumbents



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Can New Players Join?

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Today’s U.S. Broadband = Market Stagnation

The U.S. Broadband is a stalemated game of RISK©

- Best Move is **Not To Move!**
  - Who’s capturing (over-building) new territories?
  - “Do the least in territories your own”.
  - Incumbents have written the rules of the game over the last 50-100 years.
  - It’s not friendly to new players (i.e., Over-builders such as GoogleFiber).
- Stifling U.S. Economic Growth and Innovation
  - Broadband is needed for Community survival
- Lots of technical and business disruptions going on too!
  - Death of Triple Play
  - Streaming everything
  - Wireless promise of nirvana

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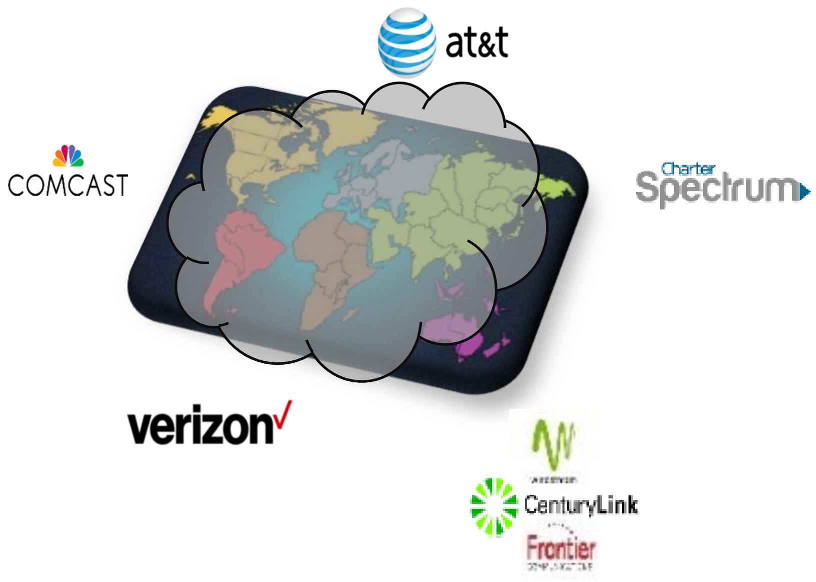
Problem: Today’s U.S. Broadband Market Stagnation

Fixed wireless and/or 5G

- Will not replace the need for fiber
- Spectrum too expensive
- Real estate and backhaul issues hinder densification
- Standards are always “5” years away.
- Towers issues in every town. NIMBY
- Unproven protocols and security issues.
- Wireless and Fiber are friends not foes.



GoogleFiber?

- Just another **over-builder** with a cool brand name.
- **Proved** the U.S. broadband market is broken and that the triple play is over.
- **Proved** *one* Service Provider can’t justify deploying fiber to lots of buildings.

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Rural Broadband

Bad News

- Isn't Broken…it was never fixed.
- Rural telephony didn't work why would rural broadband?

Good News

- CAF II and Pai
- Broadband will become "life line – like" soon enough.
- Lots of emerging wireless solutions

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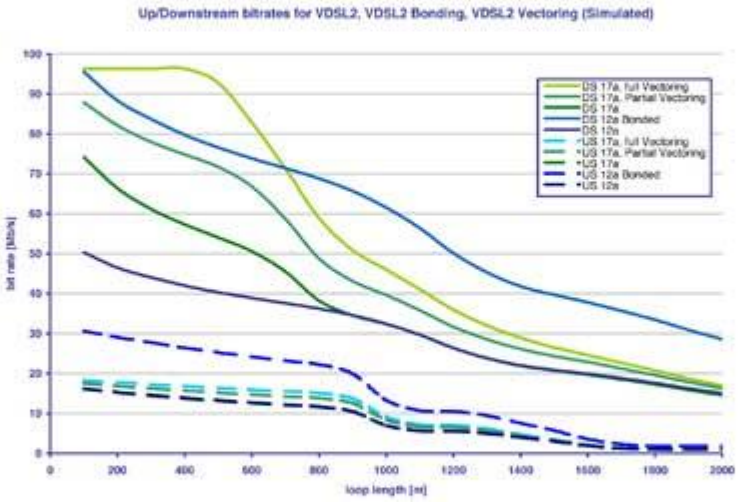
End of Incremental Upgrades For Telco!

- Telco's are nearing the end of incremental upgrade possibilities. Next steps are expensive fiber over-builds.
- Evolution of DSL nearing an end.
  - Loop lengths getting too short.
  - G.fast in U.S. almost all MDU's
  - Fiber would be so "deep" might as well go to the door.
- If you have Cable Competitors they have DOCSIS 3.1 upgrades which will buy them at least a decade before a major over-build.
  - Easy get to "Up to a gigabit" plus full TV Line-Ups for boomers.
  - Minimal incremental cost to offer "land line" voice.
  - Still have OSP upgrade/clean up issues



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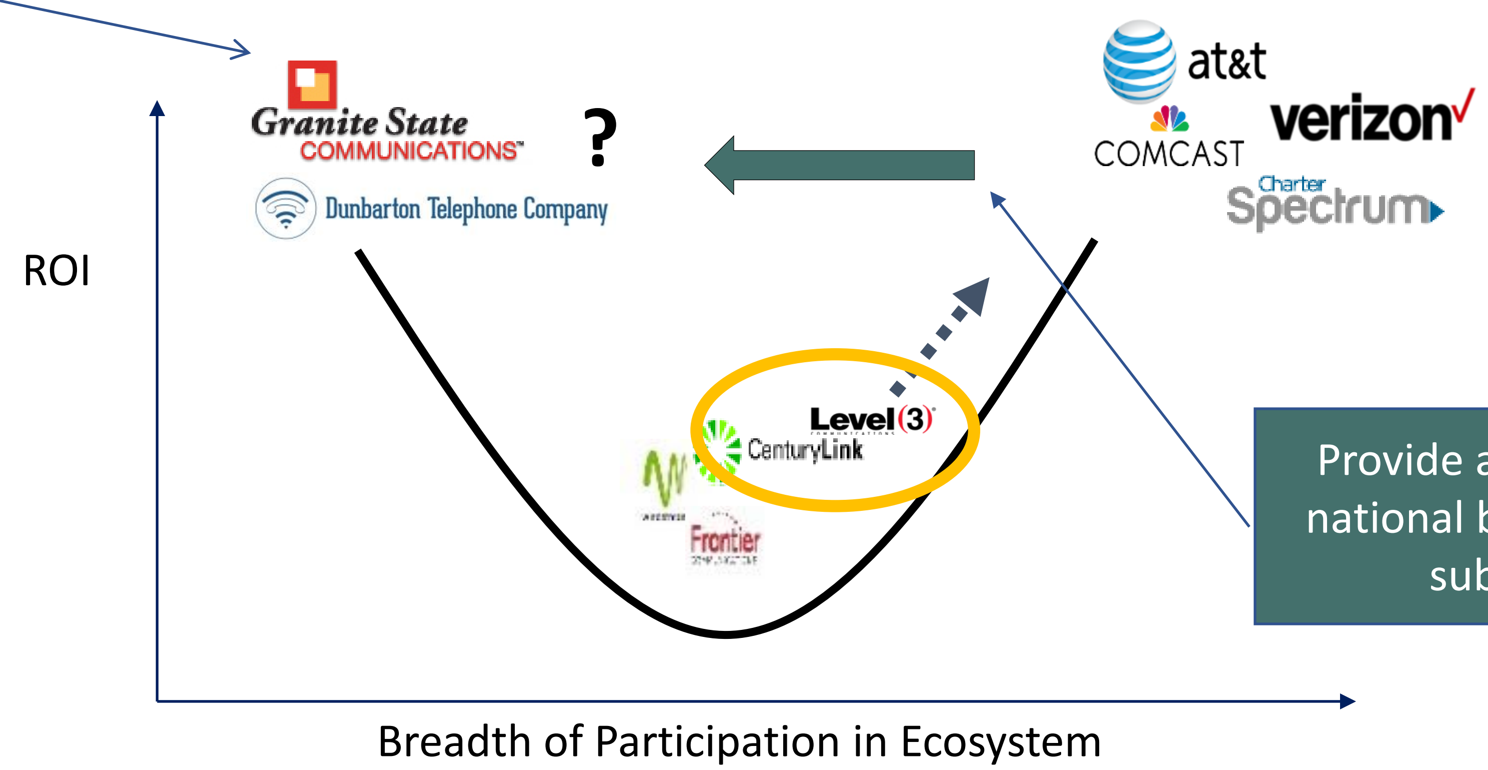
Quick Lesson From Innovation: Incumbents

How can you get here?



Provide access between national brands and local subscribers?

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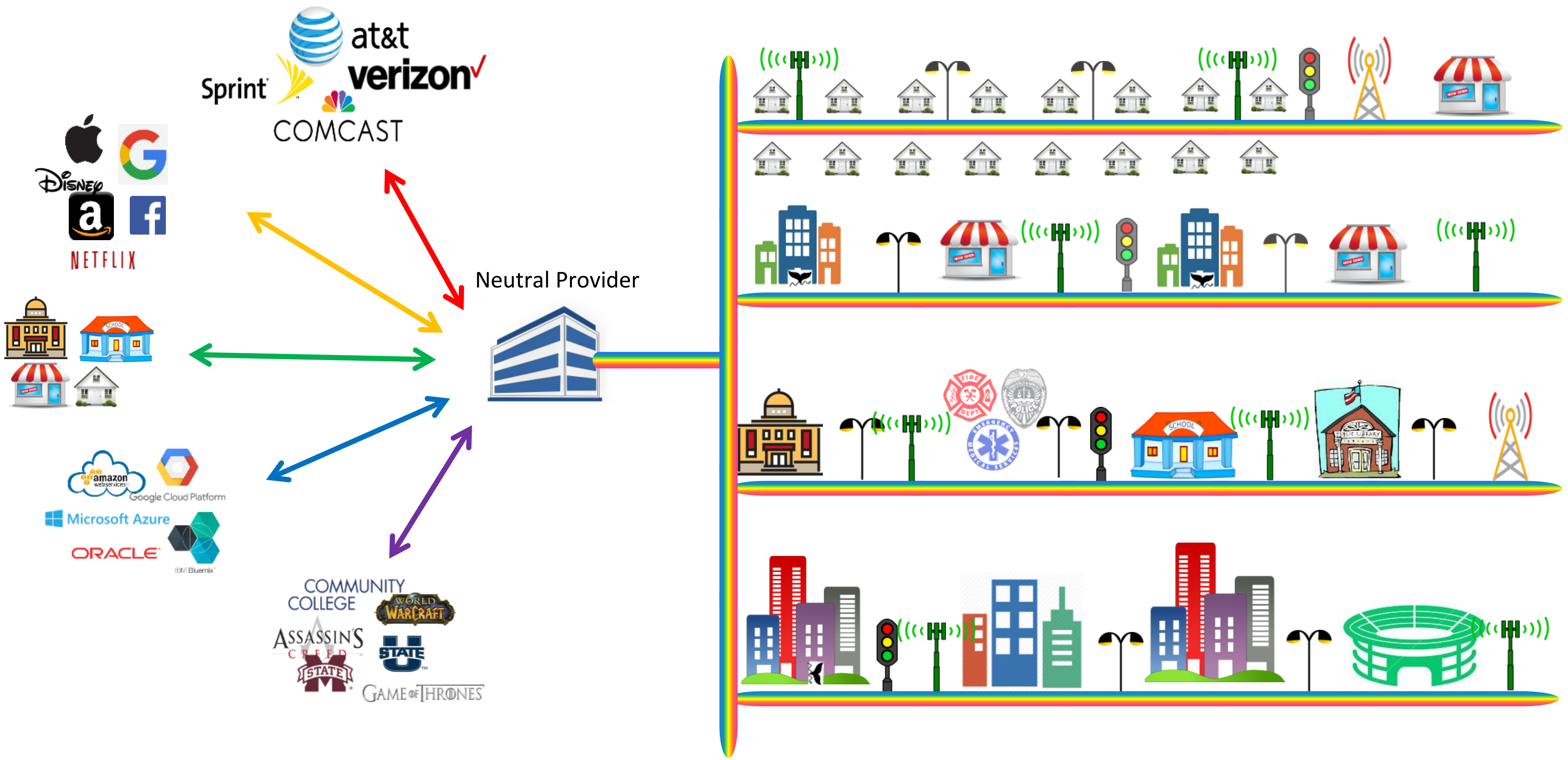
The Solution: Neutral Communication Infrastructure (NCI)

Provide "access" between local residential and business customers to "The Cloud"



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What is Neutral Communication Infrastructure?

Open Access Broadband

- Separation of services from infrastructure
- Choice for all services
- Abundant bandwidth
- Examples:
  - 2 million homes in Sweden
  - 20+ cities in the US
  - Deployments in UK, Spain, Oman, South Africa and elsewhere.

Shared Mobile Infrastructure (Towers)

- Proven financial models
- Proven business models
- Neutral Host Models
- Separation of services from infrastructure
- Examples:
  - American Tower, Crown Castle.

Neutral Communication Infrastructure

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What is Neutral Communication Infrastructure?

What is “Open Access Broadband”?

What’s Called “Open Access”	What it Really is
Huntsville, AL and GoogleFiber	Dark fiber leasing. GoogleFiber leased the entire network
Competing High Speed Incumbents	Competition
Letting other’s use your existing network	Network Unbundling, Electric Utility-Like open access
Strand-by-strand wholesaling	Dark fiber leasing
Americanized version of the European Open Access Model	Open Access Broadband (OAB)
Neutral Communication Infrastructure	**OAB + Neutral Host Wireless Infrastructure**

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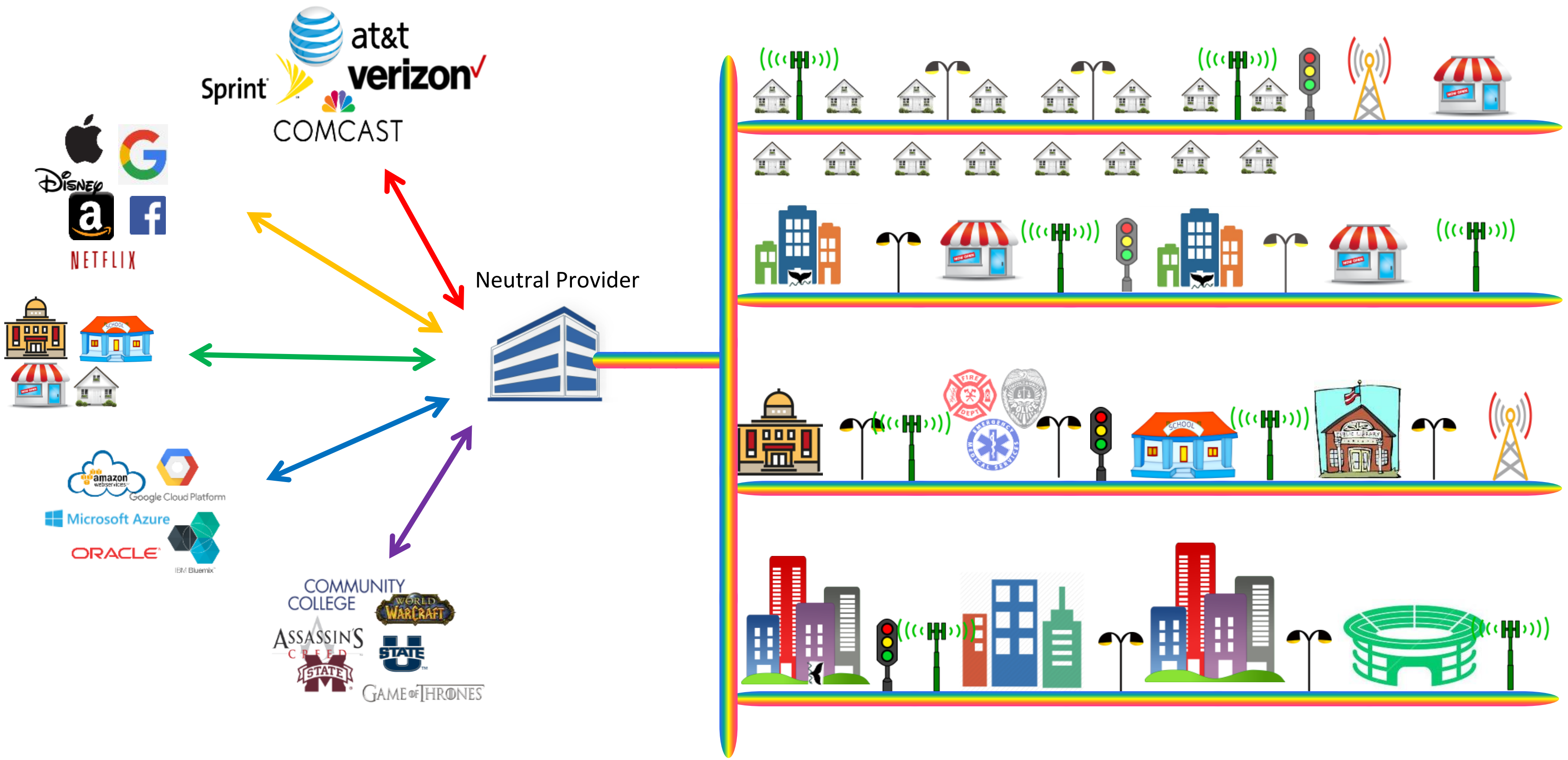
The Solution: Neutral Communication Infrastructure (NCI)

Provide “access” between local residential and business customers to “The Cloud”



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NCI Structure

Services

Active
(NCI Management)

Passive
(e.g. Fiber, Duct)

Active part is Off-the-shelf Switches & I/O hardware with Management Software

Passive Fiber is a Real Asset with a long life

Separation enables finance, ownership and operational flexibility

COTS Hardware and Open Source Software reduce OPEX by >85%

Let's you focus on one thing: infrastructure

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NCI Structure: Separation Enables Localization

Services

Active
(NCI Management)

Passive
(e.g. Fiber, Duct)

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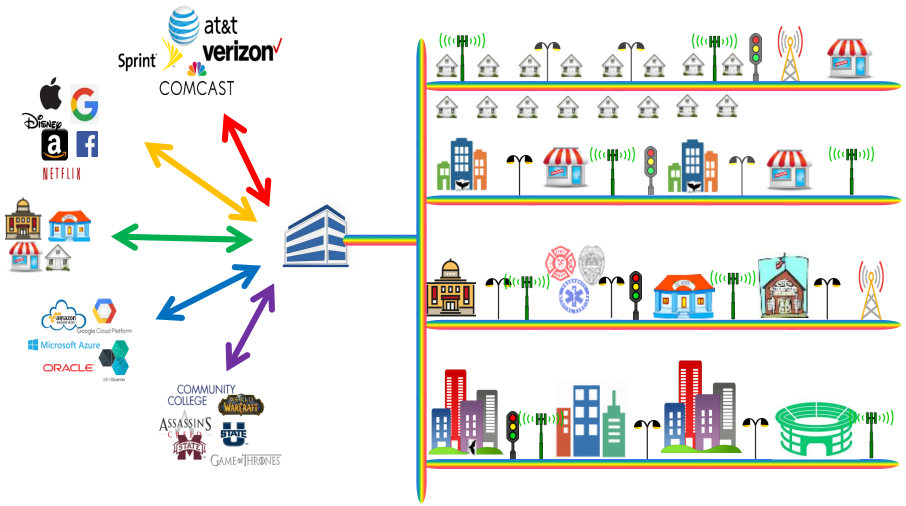
Conclusion

- U.S. Broadband Market is a barrier to economic success
- ILECS are safe unless someone over-builds your territories
- Transformation to a Neutral Communication Infrastructure Provider simplifies your business and benefits your customers and communities.
- Transform your Network and your Balance Sheet & Income Statements
  - Our models can be adapted to your local conditions
- Overcome hurdle of signing up SPs by uniting and having a common SP API across TANE's footprint.



Thank You,

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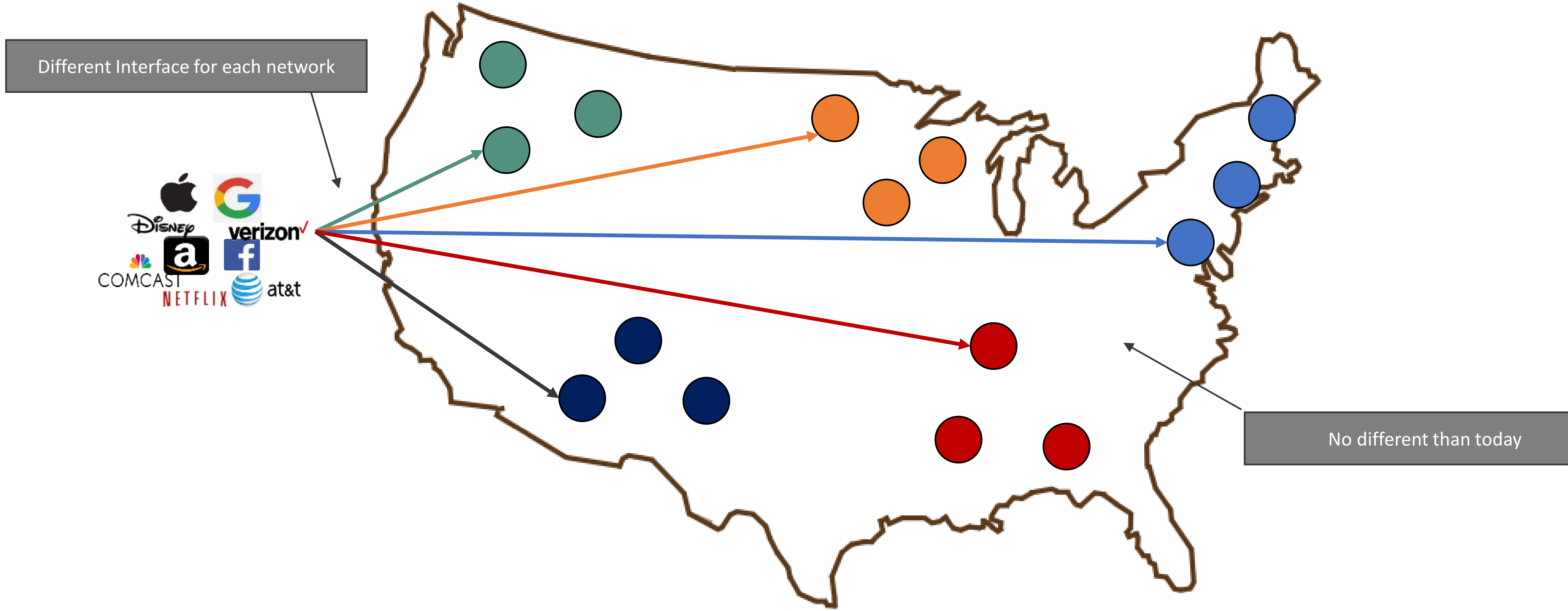
Fall 2017

Issue of Scale?



Slides from Open Networking Summit April 2017

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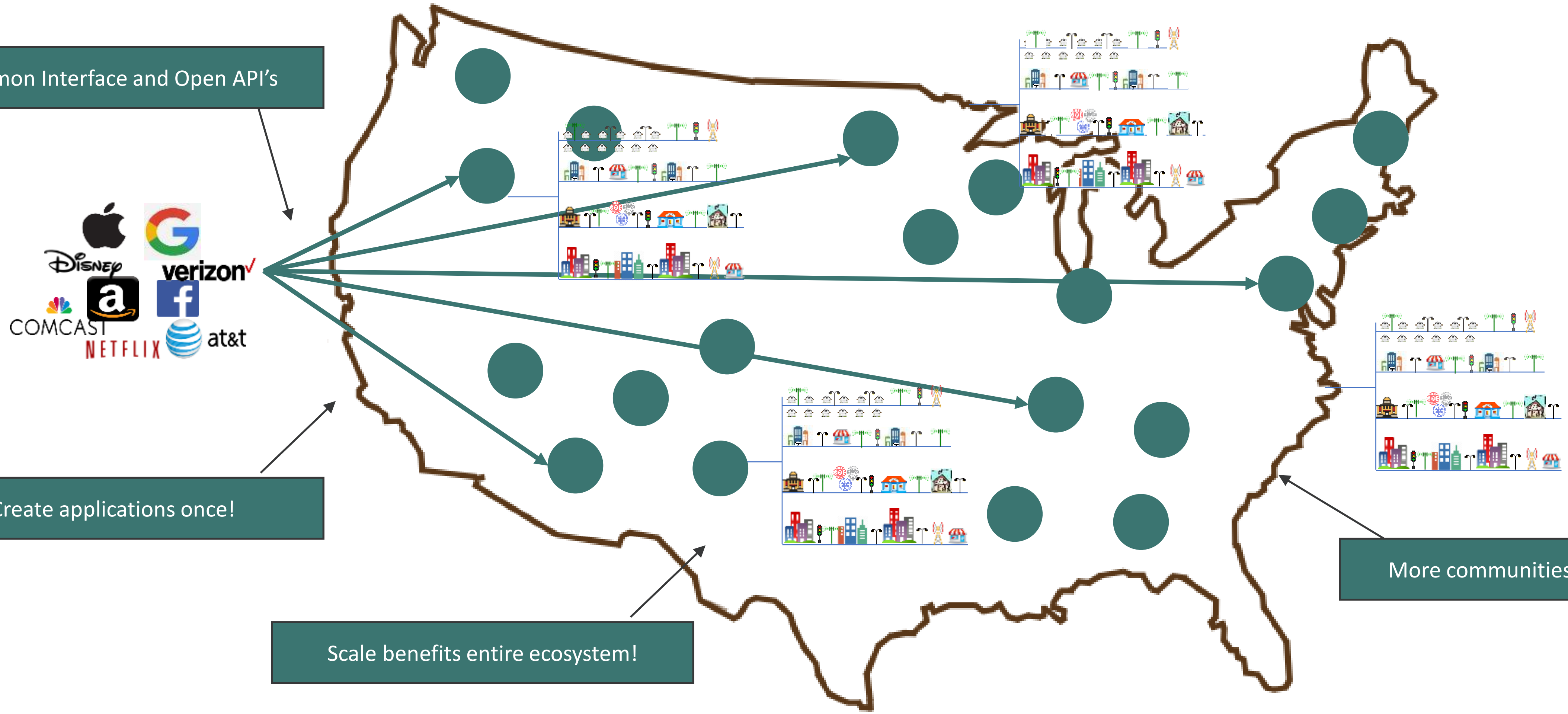
The Solution: Strength in Numbers

Common Interface and Open API's



Create applications once!

Scale benefits entire ecosystem!

More communities donating back