BROADBAND 101 FOR TRIBAL LIBRARIES WORKSHOP

INTERNET 2

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Providing Access
Preserving Arizona
Arizona State Library, Archives and Public Records

Carson Block Consulting Inc.

NATIONAL TRIBAL BROADBAND SUMMIT

SEPTEMBER 23-24, 2019

Nicole Umayam

Digital Inclusion Librarian - Arizona State Library, Archives and Public Records

Carson Block

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BROADBAND 101 TOPICS

- Digital Inclusion
- The Toward Gigabit Libraries Toolkit
- Technology Training in Rural Arizona
- Libraries Bridging the Digitial Divide

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Digital Divide(s)

The **economic, educational**, and **social** inequalities between those who have computers and online access and those who do not

LIBRARIES AS DIGITAL INCLUSION CHAMPIONS

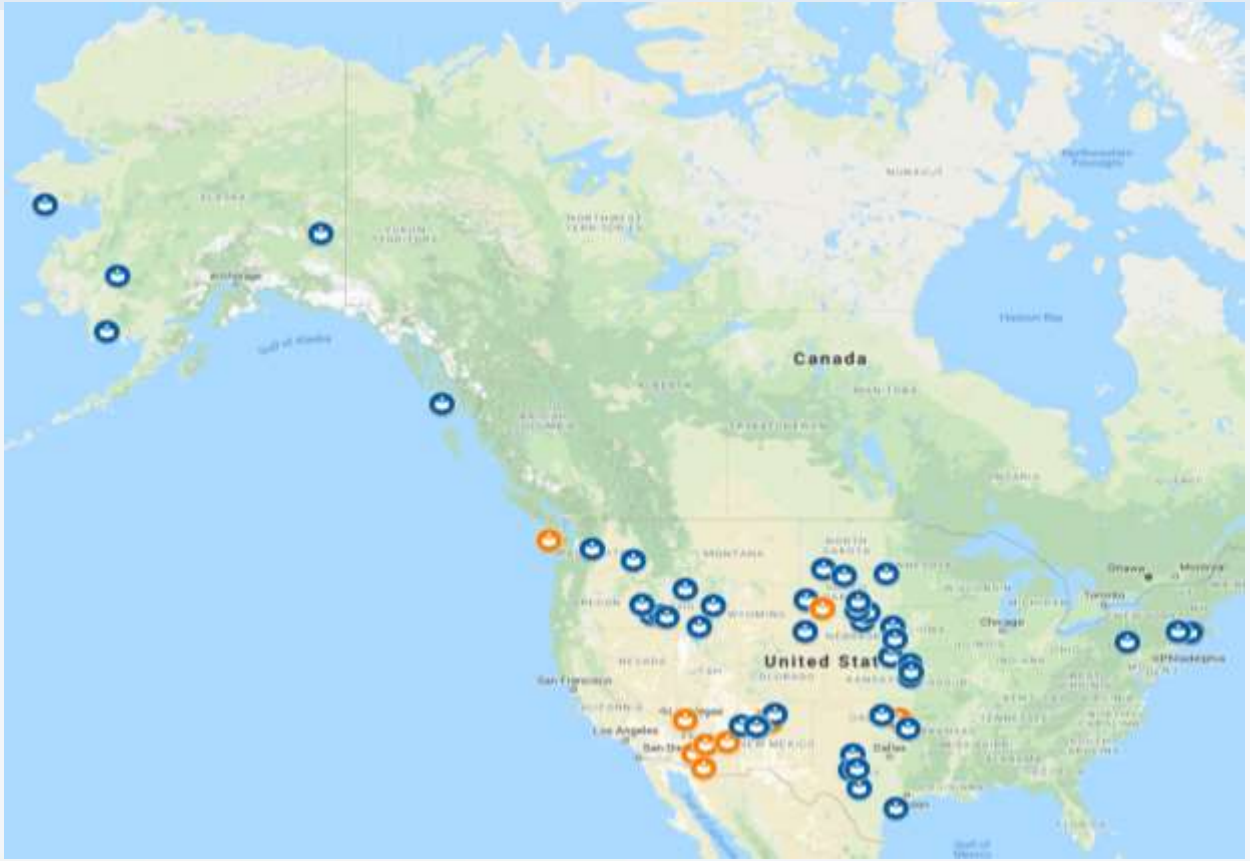
- Libraries have been “doing” digital inclusion for a long time

- …but there are aspects of digital inclusion for libraries to consider:
  - Tech confidence and tech competence
  - Ability to define the scope of the problem
  - Information about low-cost options for households

How to use the Toward Gigabit Libraries Toolkit

https://www.youtube.com/watch?v=PXWv3-HYm-I

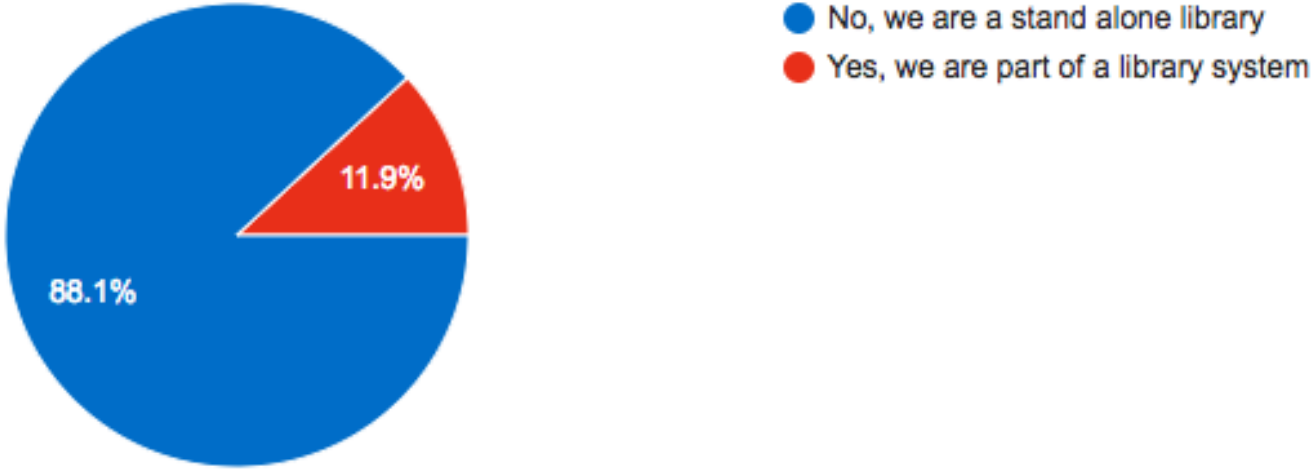
“Toward Gigabit Libraries” Site Visits (partial listing)



Library Intake Survey--Trends (59 Libraries)

Is the library part of a larger city, county, regional, library system?

59 responses



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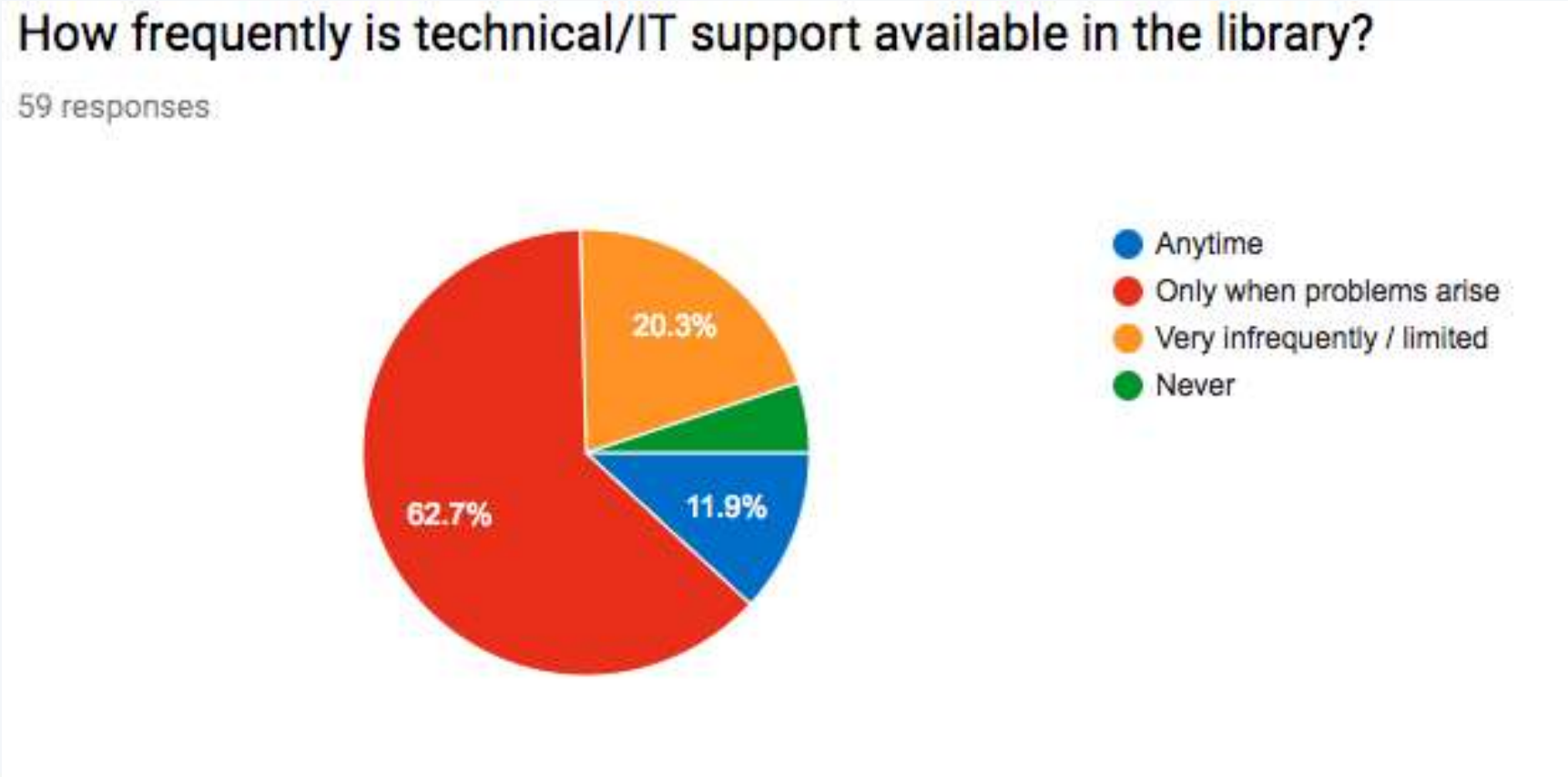
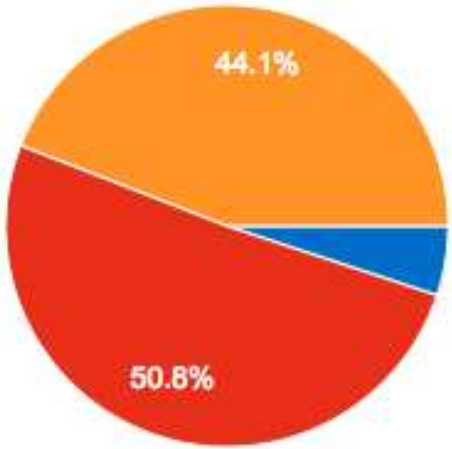


Library Intake Survey-- Trends (59 Libraries)

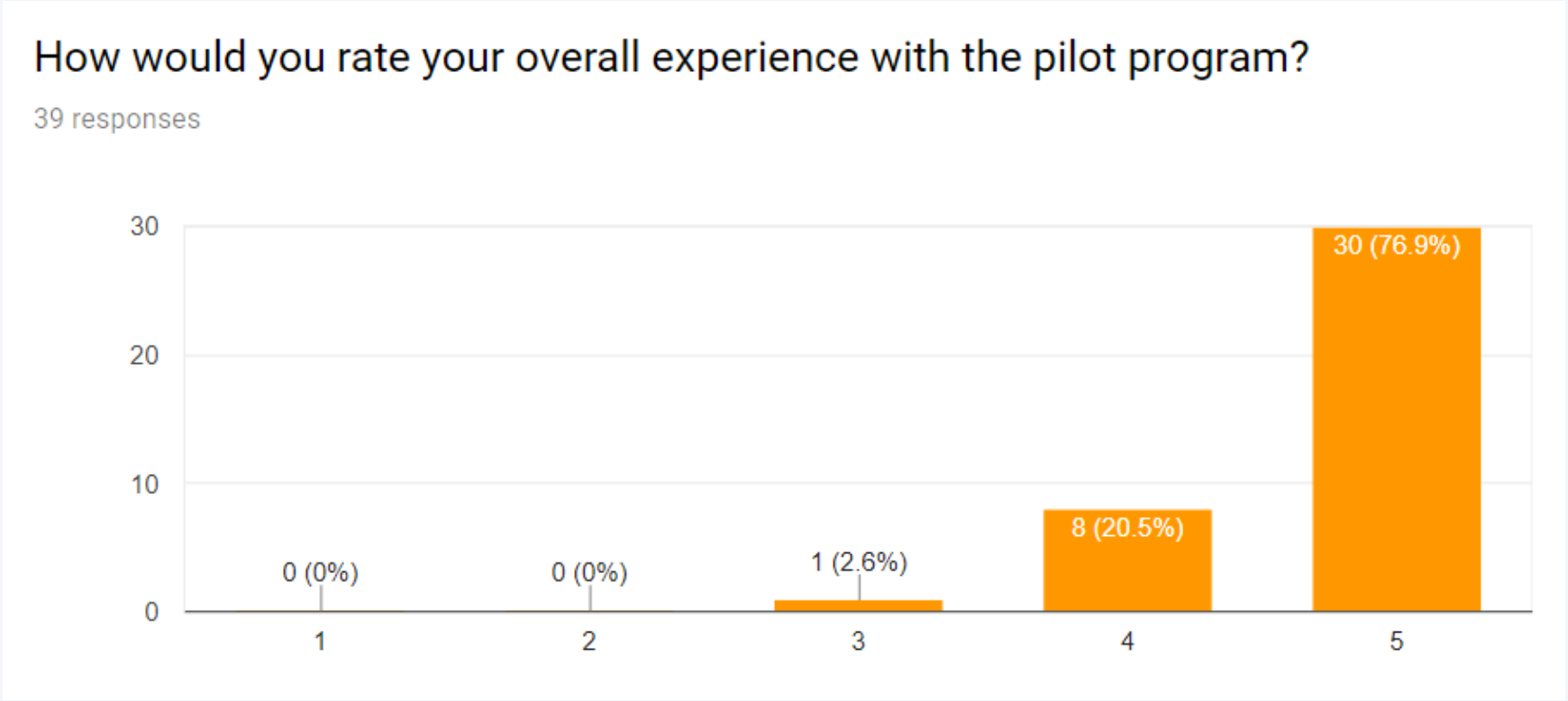
Describe your current level of expertise around procuring and delivering access to broadband as a service in your library.

59 responses

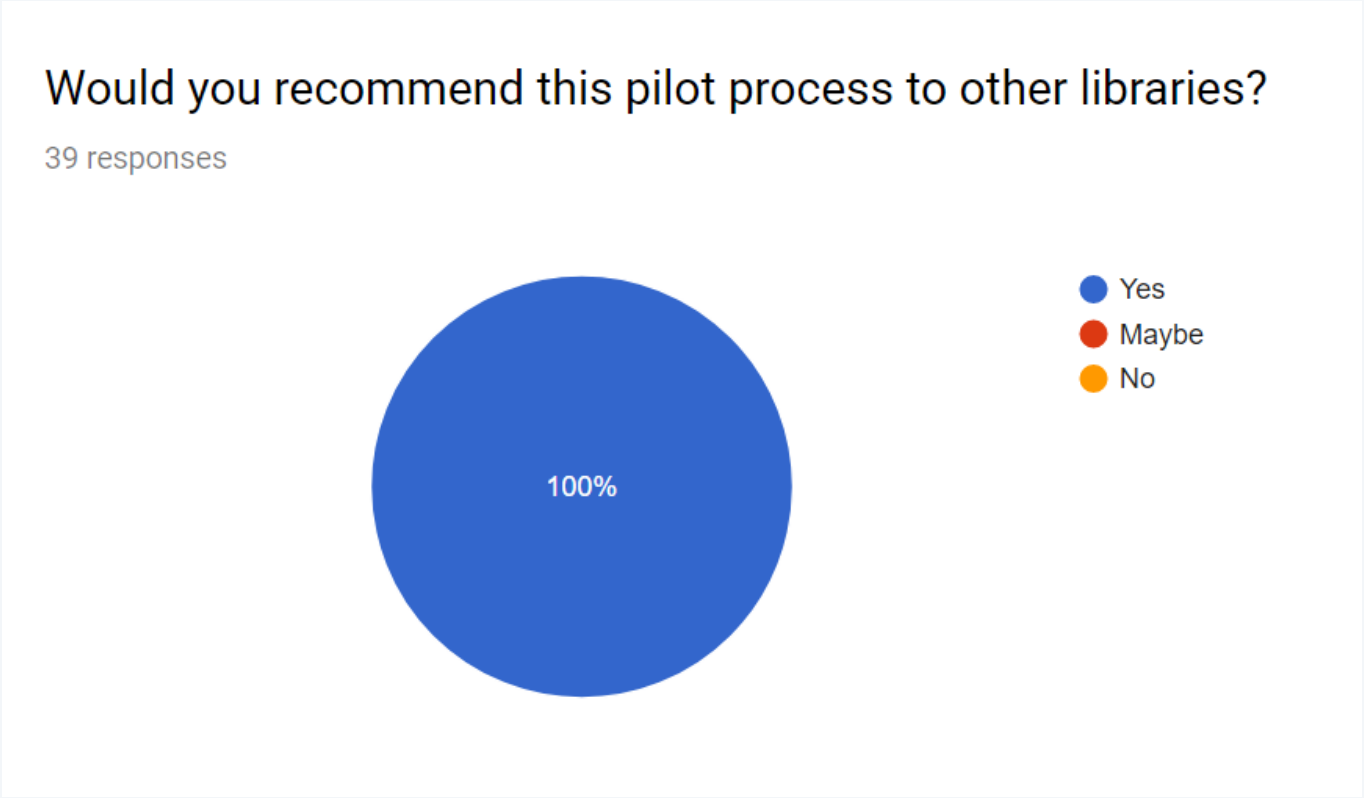


- Very Experienced-- I've been responsible for ordering and setting up our Internet connection and feel I have a good understanding of the p…
- Limited Experience-- I've had some experience with ordering and setting up our Internet connection, but I don't feel like an expert
- No Experience-- I've had no experience in ordering or setting up our Internet connection."

Feedback– Post Pilot Visit Survey



Feedback– Post Pilot Visit Survey



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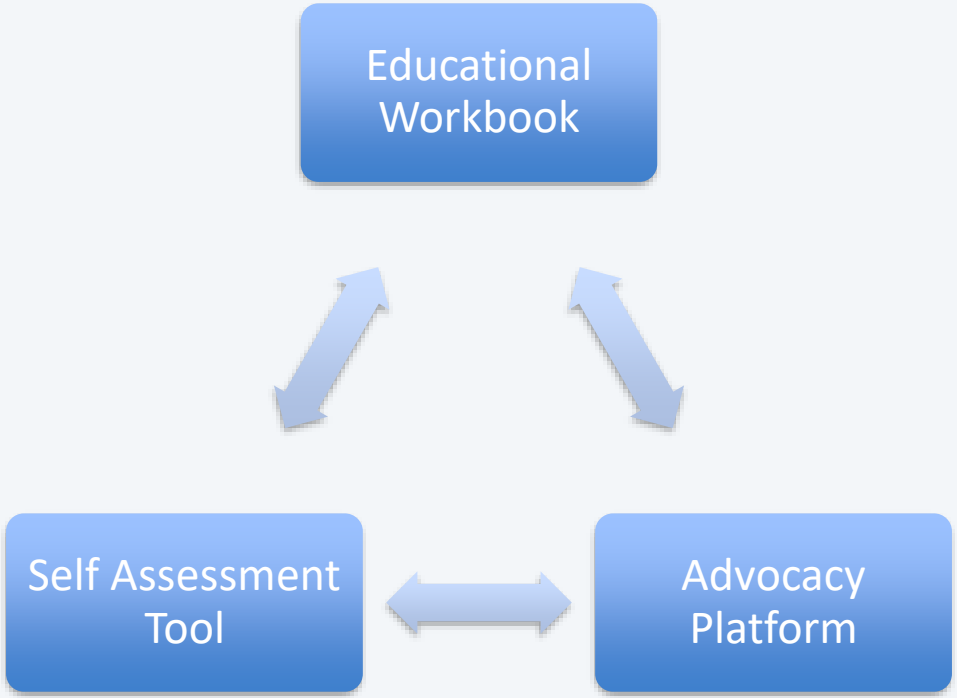
What is the Toolkit?



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Toolkit Components and Process

- *Technology Inventory*
  - *Broadband Connection*
  - *Wired Network*
  - *Network Devices*
  - *Wireless/WiFi Network*
  - *Computer/End User Devices*
- *Broadband Services and Activities*
- *Broadband Technology and Operations Support*
- *Broadband Funding*
- *Additional Resources and Best Practices*

Toolkit Approach

Questions are presented first, and additional information and resources follow in text boxes

5. TECHNOLOGY INVENTORY—YOUR LIBRARY

In this section, you will inventory some of the key pieces of the technology inside your library, including your network, computers, and other important technology components. This inventory will help you understand what sort of equipment you have now, and provides a basis to determine if you need different or additional equipment for the future.

5A. Broadband Connection

If you have more than one broadband connection, i.e., two different types of technologies or service providers, answer the following questions in this "Broadband Connection" question for each connection.

1. What type of internet connection does your library currently have?
Choose all that apply.

- ☐ Digital Subscriber Line (DSL)
- ☐ Cable Modem
- ☐ Fiber
- ☐ Wireless
- ☐ Satellite
- ☐ Other {add here}

There are three primary types of broadband—wireline (DSL, cable modem, and fiber), wireless, and satellite. Definitions for the types of Internet connections listed here are available at the FCC website:-https://www.fcc.gov/general/types-broadband-connections

Speed Ranges by Type of Broadband (Kbps - kilobit, Mbps - megabit, Tbps - terabit)

Technology	Type	Download Speed Range	Upload Speed Range
Fiber	Wireline	100 Mbps - 1 Tbps	100 Mbps - 1 Tbps
Cable Modem*	Wireline	256 Kbps - 10 Gbps	256 Kbps - 10 Gbps
DSL*	Wireline	256 Kbps - 100 Mbps	256 Kbps - 16 Mbps
Fixed Wireless / Microwave	Wireless	1 Mbps - 155 Mbps	1 Mbps - 155 Mbps

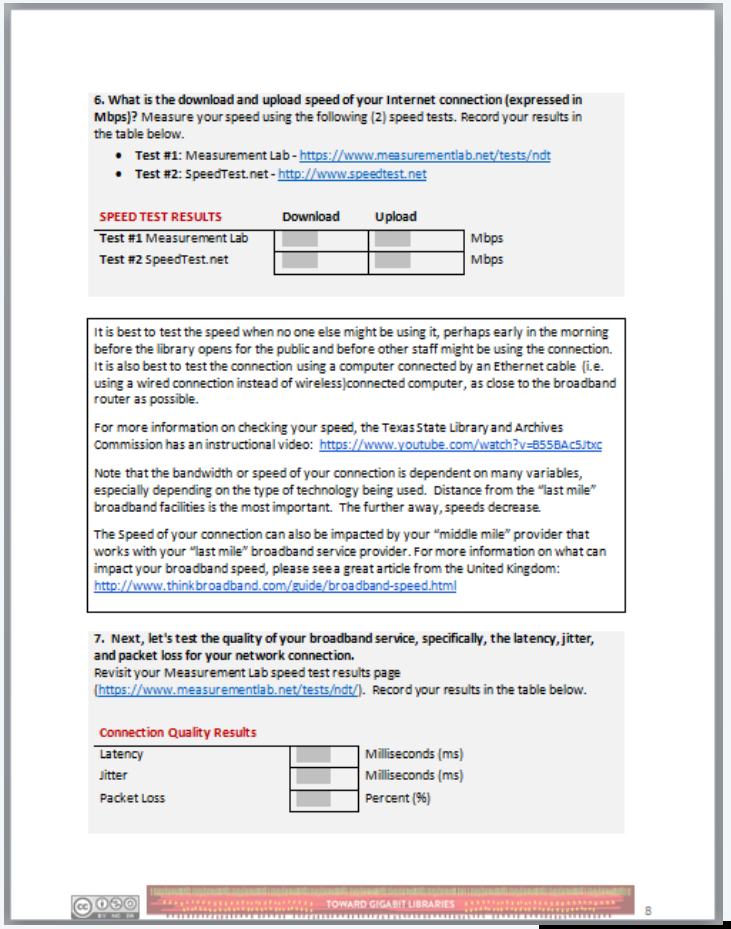
USING THE TOOLKIT

- Free, open-source technology learning, diagnostic, and advocacy tool
- Useful for: preparing Erate requests and budget cycles; helping open communication between library staff and tech workers
- Can be used piecemeal to address specific problems in your library
- No techies required!

Technology Inventory – Your Library

In this section, you will inventory some of the key pieces of the technology inside your library, including your network, computers, and other important technology components. This inventory will help you understand what sort of equipment you have now, and provides a basis to determine if you need different or additional equipment for the future.

- Broadband Connection
- Network Devices
- Wired Network and Power
- Wireless Network and Power
- Computer and End User Devices



6. What is the download and upload speed of your Internet connection (expressed in Mbps)? Measure your speed using the following (2) speed tests. Record your results in the table below.

- **Test #1**: Measurement Lab - https://www.measurementlab.net/tests/ndt
- **Test #2**: SpeedTest.net - http://www.speedtest.net

SPEED TEST RESULTS	Download	Upload	
Test #1 Measurement Lab			Mbps
Test #2 SpeedTest.net			Mbps

It is best to test the speed when no one else might be using it, perhaps early in the morning before the library opens for the public and before other staff might be using the connection. It is also best to test the connection using a computer connected by an Ethernet cable (i.e. using a wired connection instead of wireless)connected computer, as close to the broadband router as possible.

For more information on checking your speed, the Texas State Library and Archives Commission has an instructional video: https://www.youtube.com/watch?v=B55BAc5JtxI

Note that the bandwidth or speed of your connection is dependent on many variables, especially depending on the type of technology being used. Distance from the "last mile" broadband facilities is the most important. The further away, speeds decrease.

The Speed of your connection can also be impacted by your "middle mile" provider that works with your "last mile" broadband service provider. For more information on what can impact your broadband speed, please see a great article from the United Kingdom: http://www.thinkbroadband.com/guide/broadband-speed.html

7. Next, let's test the quality of your broadband service, specifically, the latency, jitter, and packet loss for your network connection.
Revisit your Measurement Lab speed test results page (https://www.measurementlab.net/tests/ndt/). Record your results in the table below.

Connection Quality Results		
Latency		Milliseconds (ms)
Jitter		Milliseconds (ms)
Packet Loss		Percent (%)

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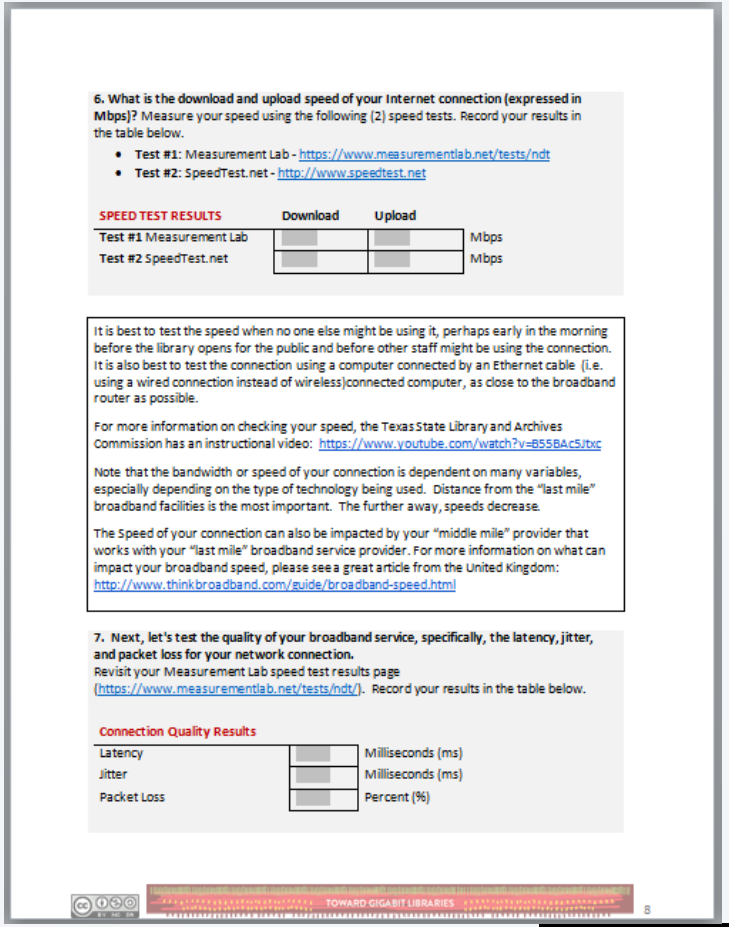
Broadband Services and Activities

In this section, the types of broadband services and applications are discussed in order to ensure that the library has sufficient bandwidth to support patron and staff use of various devices and applications both today and in the future.

- Bandwidth Needs
- Hot-Spot Lending
- Internet Filtering
- Offered Services



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Packet Loss		Percent (%)

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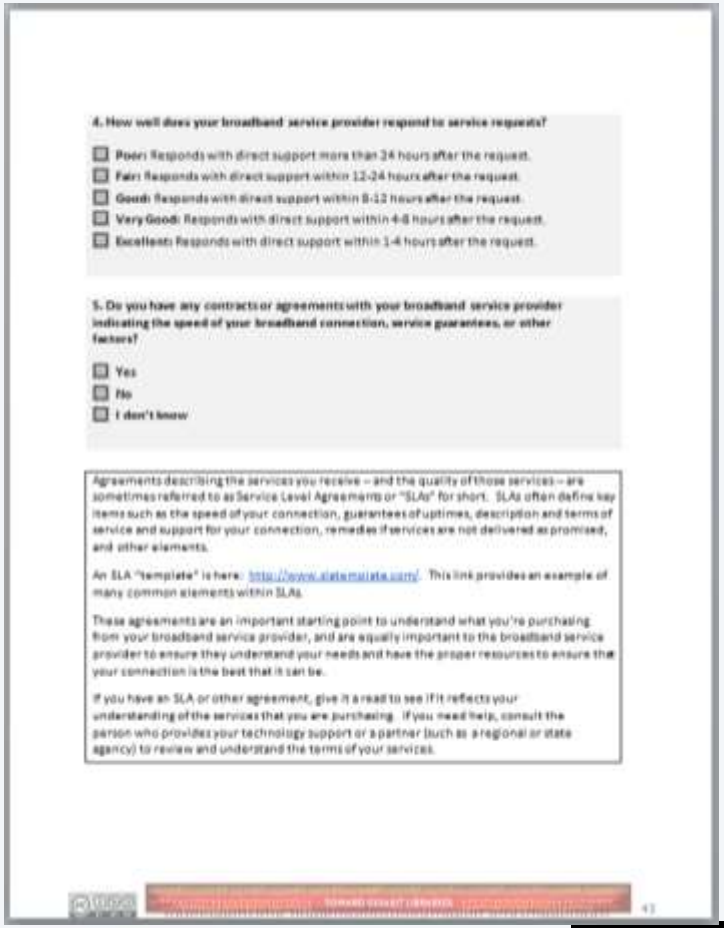
Broadband Technical Operational Support

Technology in libraries is more than just a collection of gear. People, including library staff and those who provide technical support, are just as important. In this section you will learn more about the people who help make technology available in your library and determine if there are any areas where you could benefit from additional support.

- Available Technology Support
- Staff Training Resources
- ISP Technical Support
- ISP Service Requests
- ISP Service Guarantees



4. How well does your broadband service provider respond to service requests?

- ☐ **Poor:** Responds with direct support more than 24 hours after the request.
- ☐ **Fair:** Responds with direct support within 12-24 hours after the request.
- ☐ **Good:** Responds with direct support within 8-12 hours after the request.
- ☐ **Very Good:** Responds with direct support within 4-8 hours after the request.
- ☐ **Excellent:** Responds with direct support within 1-4 hours after the request.

5. Do you have any contracts or agreements with your broadband service provider indicating the speed of your broadband connection, service guarantees, or other factors?

- ☐ Yes
- ☐ No
- ☐ I don't know

Agreements describing the services you receive – and the quality of those services – are sometimes referred to as Service Level Agreements or "SLAs" for short. SLAs often define key items such as the speed of your connection, guarantees of uptimes, description and terms of service and support for your connection, remedies if services are not delivered as promised, and other elements.

An SLA "template" is here: http://www.slatemplate.com/. This link provides an example of many common elements within SLAs.

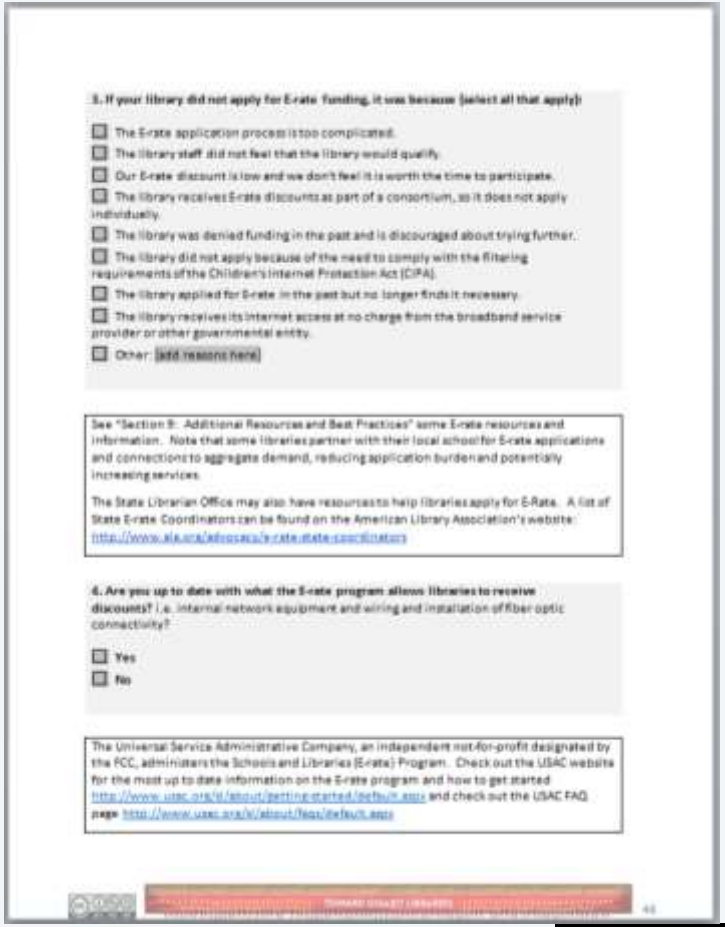
These agreements are an important starting point to understand what you're purchasing from your broadband service provider, and are equally important to the broadband service provider to ensure they understand your needs and have the proper resources to ensure that your connection is the best that it can be.

If you have an SLA or other agreement, give it a read to see if it reflects your understanding of the services that you are purchasing. If you need help, consult the person who provides your technology support or a partner (such as a regional or state agency) to review and understand the terms of your services.

Broadband Funding

Technology expenses are important budget considerations for all libraries. In this section you will learn about several opportunities available to help provide funding for your library broadband connectivity.

- Price For Connection
- E-rate Funding
- Other Funding Sources



3. If your library did not apply for E-rate funding, it was because (select all that apply):

- ☐ The E-rate application process is too complicated.
- ☐ The library staff did not feel that the library would qualify.
- ☐ Our E-rate discount is low and we don't feel it is worth the time to participate.
- ☐ The library receives E-rate discounts as part of a consortium, so it does not apply individually.
- ☐ The library was denied funding in the past and is discouraged about trying further.
- ☐ The library did not apply because of the need to comply with the filtering requirements of the Children's Internet Protection Act (CIPA).
- ☐ The library applied for E-rate in the past but no longer finds it necessary.
- ☐ The library receives its Internet access at no charge from the broadband service provider or other governmental entity.
- ☐ Other: [add reasons here]

See "Section 9: Additional Resources and Best Practices" some E-rate resources and information. Note that some libraries partner with their local school for E-rate applications and connections to aggregate demand, reducing application burden and potentially increasing services.

The State Librarian Office may also have resources to help libraries apply for E-Rate. A list of State E-rate Coordinators can be found on the American Library Association's website: http://www.ala.org/advocacy/e-rate/state-coordinators

4. Are you up to date with what the E-rate program allows libraries to receive discounts? I.e. internal network equipment and wiring and installation of fiber optic connectivity?

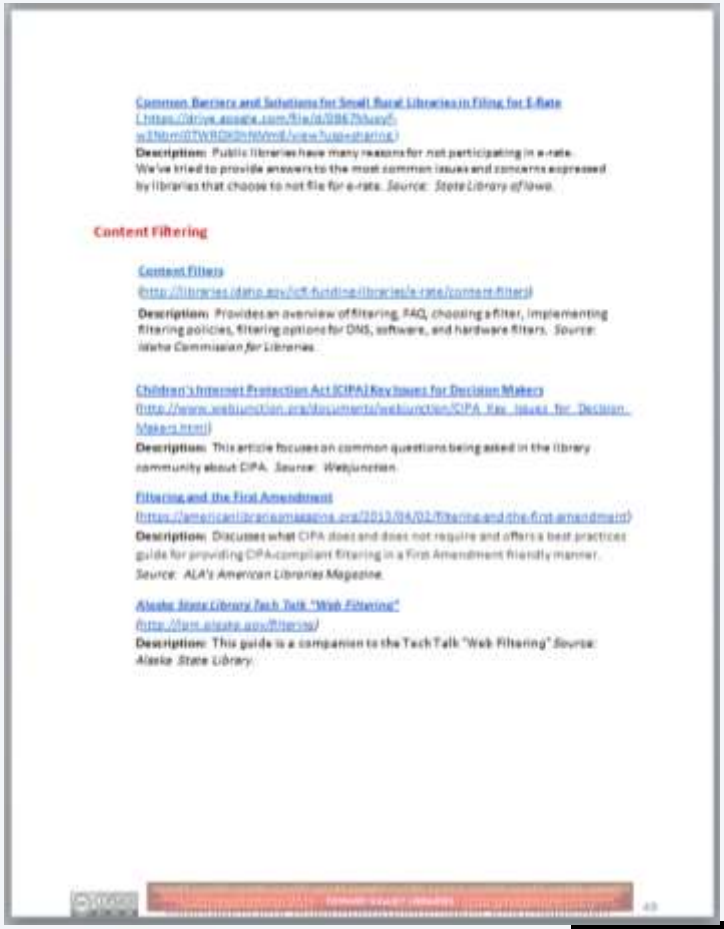
- ☐ **Yes**
- ☐ **No**

The Universal Service Administrative Company, an independent not-for-profit designated by the FCC, administers the Schools and Libraries (E-rate) Program. Check out the USAC website for the most up to date information on the E-rate program and how to get started http://www.usac.org/sl/about/getting-started/default.aspx and check out the USAC FAQ page http://www.usac.org/sl/about/faqs/default.aspx

Additional Resources and Best Practices

The topics listed here are designed to provide you even more insight and resources into improving your library's broadband connectivity and services. You may find these items helpful in gaining a better understanding of your broadband connection, data network, and computers.

- Erate
- Content Filtering
- Additional Broadband 101 Resources
- Free Technology Related Training Opportunities & Resources for Librarians
- Data Backup
- Internet Use Policies



Common Barriers and Solutions for Small Rural Libraries in Filing for E-Rate
(https://drive.google.com/file/d/0B67bfuzyF-w3Nbm0TWRDKlhNWmd/view?usp=sharing)
Description: Public libraries have many reasons for not participating in e-rate. We've tried to provide answers to the most common issues and concerns expressed by libraries that choose to not file for e-rate. *Source: State Library of Iowa.*

Content Filtering

Content Filters
(http://libraries.idaho.gov/icfl-funding-libraries/e-rate/content-filters)
Description: Provides an overview of filtering, FAQ, choosing a filter, implementing filtering policies, filtering options for DNS, software, and hardware filters. *Source: Idaho Commission for Libraries.*

Children's Internet Protection Act (CIPA) Key Issues for Decision Makers
(http://www.webjunction.org/documents/webjunction/CIPA_Key_Issues_for_Decision_Makers.html)
Description: This article focuses on common questions being asked in the library community about CIPA. *Source: Webjunction.*

Filtering and the First Amendment
(https://americanlibrariesmagazine.org/2013/04/02/filtering-and-the-first-amendment)
Description: Discusses what CIPA does and does not require and offers a best practices guide for providing CIPA-compliant filtering in a First Amendment friendly manner. *Source: ALA's American Libraries Magazine.*

Alaska State Library Tech Talk "Web Filtering"
(http://lam.alaska.gov/filtering)
Description: This guide is a companion to the Tech Talk "Web Filtering" *Source: Alaska State Library.*

Glossary

Category (Cat) 5e Cable
The category 5e specification improves upon the category 5 specification by tightening some crosstalk specifications and introducing new crosstalk specifications that were not present in the original category 5 specification. The bandwidth of category 5 and 5e is the same – 100 MHz. The differences between category 5 and category 5e are in their transmission performance. Category 5e components are most suitable for a high-speed Gigabit Ethernet. While category 5 components may function to some degree in a Gigabit Ethernet, they perform below standard during high-data transfer scenarios.

Category (Cat) 6 Cable
A standardized cable for Gigabit Ethernet and other network physical layers that is backward compatible with the Category 5/5e and Category 3 cable standards. Compared with Cat 5 and Cat 5e, Cat 6 features more stringent specifications for crosstalk and system noise. The cable standard provides performance of up to 250 MHz and is suitable for 10BASE-T, 100BASE-TX (Fast Ethernet), 1000BASE-T/1000BASE-TX (Gigabit Ethernet) and 10GBASE-T (10-Gigabit Ethernet).

Device Authentication—MAC Address
Is used to authenticate devices based on their physical media access control (MAC) address. While not the most secure and scalable method, MAC-based authentication implicitly provides an additional layer of security authentication devices. MAC-based authentication is often used to authenticate and allow network access through certain devices while denying access to the rest. For example, if clients are allowed access to the network via station A, then one method of authenticating station A is MAC-based. Clients may be required to authenticate themselves using other methods depending on the network privileges required.

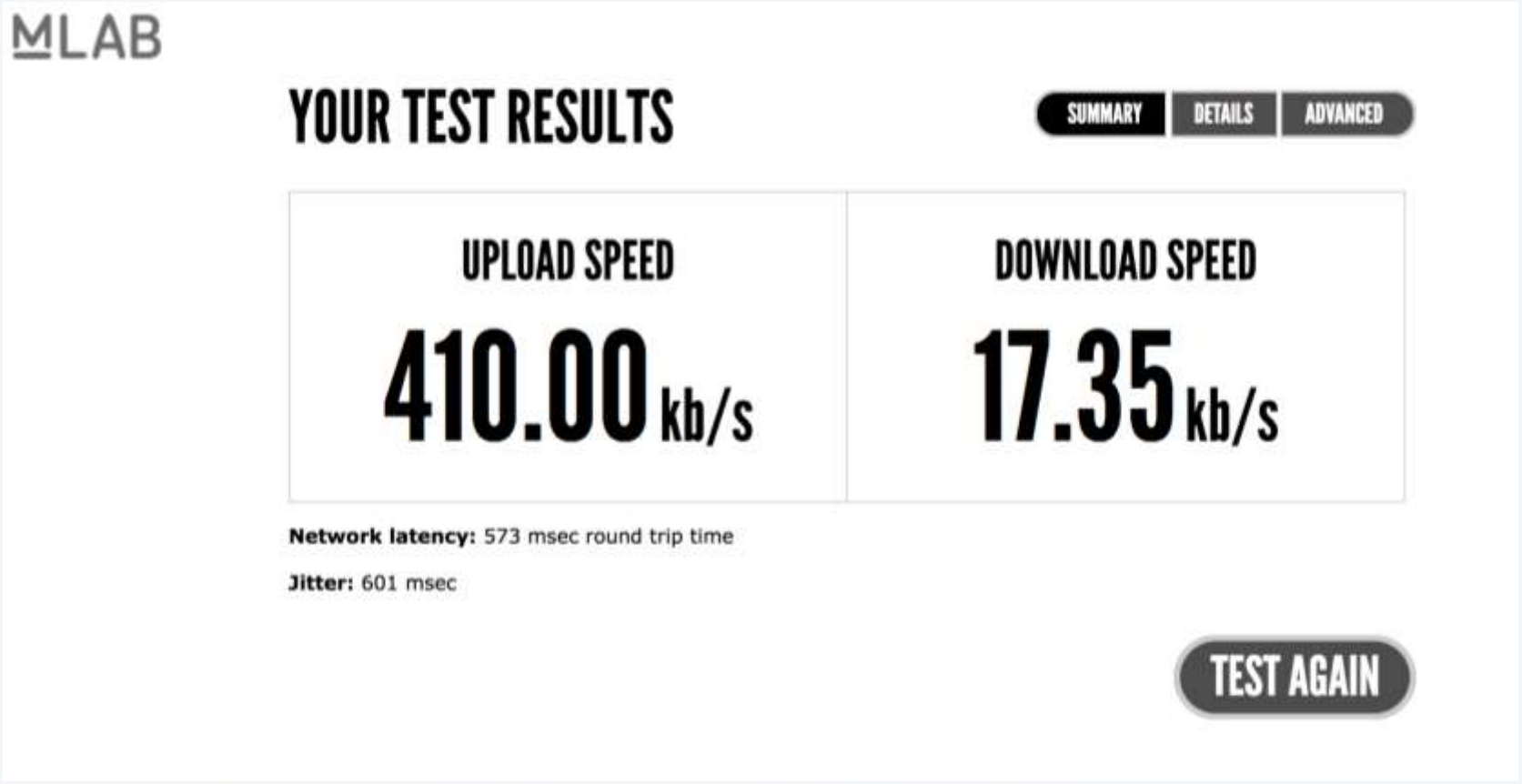
Endpoint
Anything attached to the network, including PC, laptop, tablet, phone, iPod, etc.

Ethernet
A computer network architecture consisting of various specified local-area network protocols, devices, and connection methods.

Ethernet Port
An Ethernet port is an opening on computer network equipment that Ethernet cables plug into. Ethernet ports accept cables with RJ-45 connectors, including Cat cables.

Does your tech room look like this? (Actual Site Visit Photos)

Does your internet speed look like this? (Togiak, Alaska)



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You can find the Toolkit here:

https://www.internet2.edu/tgl/

PROJECT STAFF

James Werle

Susanna Spellman

Carson Block

TOOLKIT USERS – NICOLE UMAYAM

Digital Inclusion Librarian - Arizona State Library, Archives And Public Records

ARIZONA

- 5 libraries visited (December 2017)
  - San Lucy District Library (Tohono O'Odham)
  - Edward McElwain Memorial Library (Hualapai)
  - Whiteriver Public Library (Fort Apache)
  - Fort McDowell Yavapai Tribal Library
  - Venito Garcia Library (Tohono O'Odham)
- At the table:
  - Library staff
  - Internet2 (James Werle)
  - State Library staff (Library Development, E-Rate)
  - Network specialists from ASU and NAU
  - Tribal I.T.
  - Tribal Education directors

ARIZONA: TAKEAWAYS

- Discussion of digital service needs led to discussion of local interests
  - Broadband access in the community
  - Digital skills training
  - Language preservation, digitization projects
- There is power in holding space for multiple stakeholders to gather
  - Increased understanding of library's role in the community

Next steps

- Using the toolkit to support libraries for Category 2 E-Rate applications

TECH TRAINING IN ARIZONA

SECTION I: COMPUTER HARDWARE & SOFTWARE

In this section Carson talked about the pieces that make up a computer, what the different connections are, and basic maintenance.

Then participants got to pull things apart!

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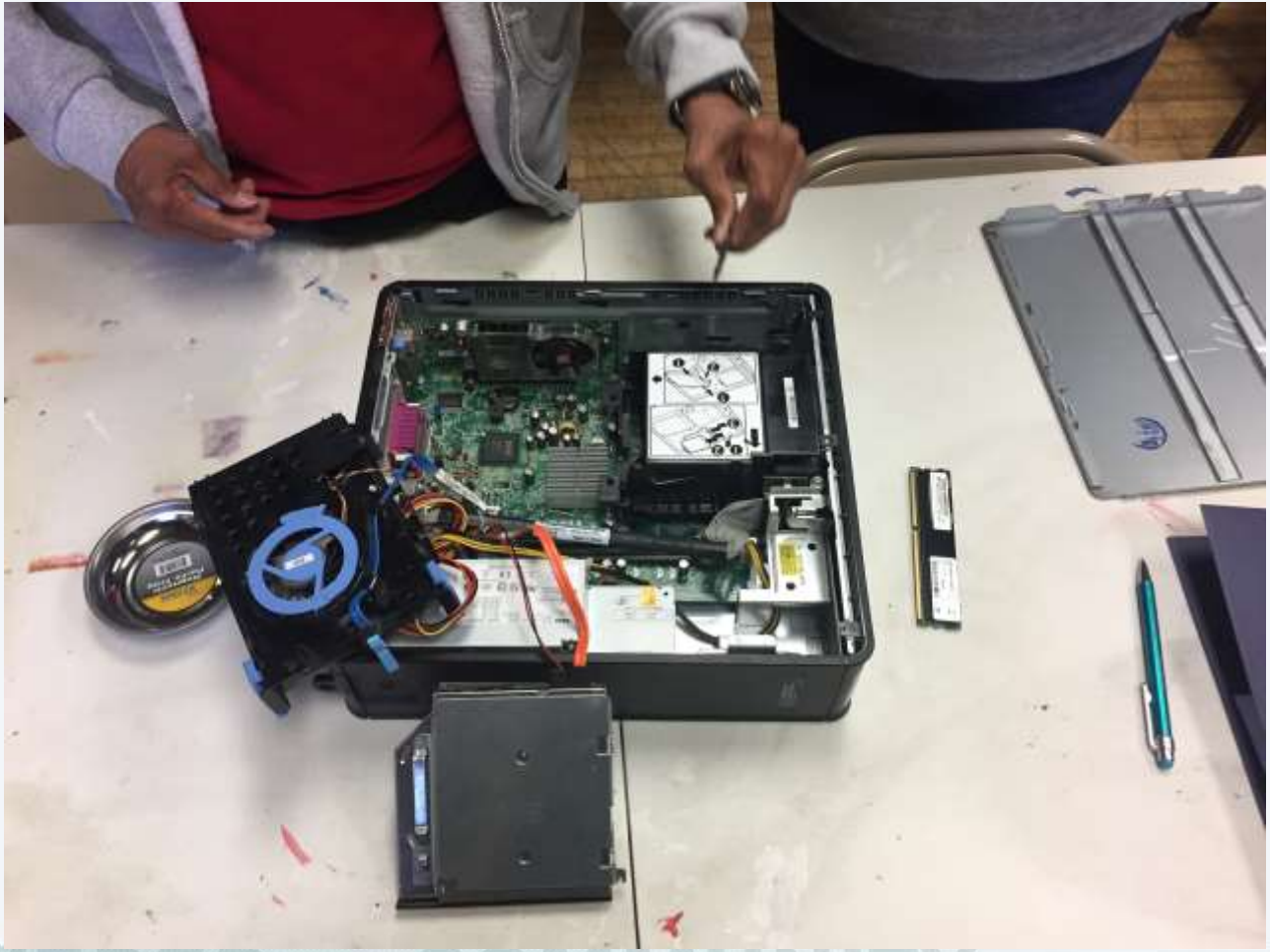

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SECTION 2: SOFTWARE AND SECURITY

SECTION 2: SOFTWARE AND SECURITY

In this section Carson talked about the basics of software, from building blocks (Operating Systems) to restoring computers to a like-new state and keeping them that way with security.

Then participants put computers back together!

How We See Our Computing Experience

Evaluating Software Before Purchase

Key Questions:

- What do you need to accomplish?
- Is there a standard or a "standard?" If yes – use it!
- Is it unique or special?
- What about open source software?
- Do vendors offer discounts?
  For example: TechSoup, governmental & educational

SECTION 3: AZSTRUT HANDING OUT LAPTOPS

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SECTION 4: INTRO TO TECHNOLOGY PLANNING

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What's Next: From "Buckets" to Goals and Actions

- Buckets: Ideas that have some similarity & can be grouped together
- Goals: high level statements reflecting the Buckets (as you've organized them)
- Actions: Refinement of the ideas in your Buckets. Often you can combine several ideas into one action or similar set of actions.
- Timeframes and responsible parties: Don't skip this in your actual plan!

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Libraries Bridging the Digital Divide

THE INTERNET IS IMPORTANT TO EVERYONE.

Why isn't everyone using it?

COST

"I can't afford internet service."

36%

find it too costly for the technology and/or internet service.

RELEVANCE

"I don't think the internet is important to my quality of life."

19%

are not aware of the potential uses of the internet and do not see it as relevant to their daily lives.

LACK OF SKILLS

"I don't know how to use a computer."

22%

don't have the digital skills necessary.

Learn how you can increase access and use of information technology in your community.

Visit: oc.lc/digitalinclusion

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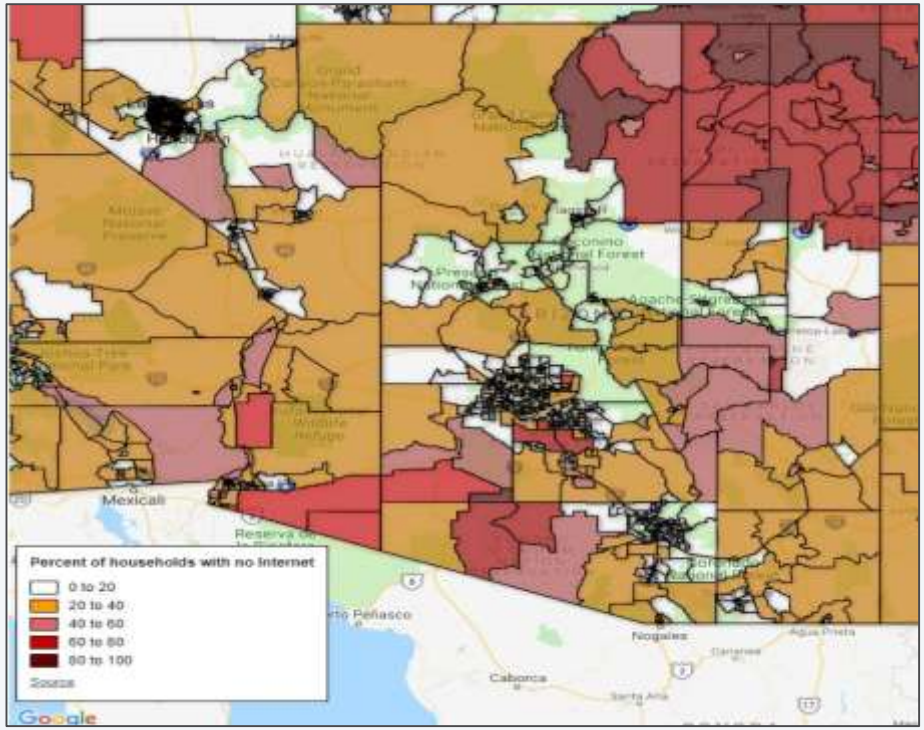
What does the digital divide look like?



13% of Arizona's total population still does not have broadband access

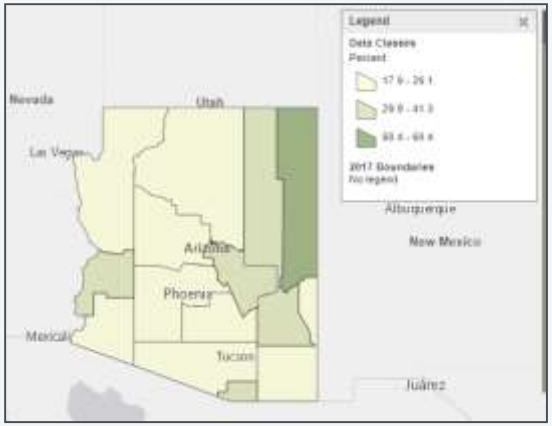
- **63% of those lacking access reside in rural areas**

95 percent of the tribal population has no broadband access

Arizona Department of Administration. February 2018. Arizona Statewide Broadband Strategic Plan. https://azlibrary.gov/sites/default/files/erate_2018_az_broadbandstrategicplan_final.PDF

https://www.digitalinclusion.org/home-internet-maps/

Local Trends



Thematic Map of Percent; Estimate; TYPE OF INTERNET SUBSCRIPTIONS - Without an Internet subscription
Geography: by County

Subject	Arizona			
	Total		Percent	
	Estimate	Margin of Error	Estimate	Margin of Error
Total households	2,552,972	+/-11,005	(X)	(X)
TYPES OF COMPUTER				
Has one or more types of computing devices:	2,355,933	+/-12,789	92.2%	+/-0.3
Desktop or laptop	2,039,868	+/-14,148	79.9%	+/-0.4
Desktop or laptop with no other type of computing device	136,792	+/-6,231	5.4%	+/-0.2
Smartphone	2,125,862	+/-13,355	83.3%	+/-0.4
Smartphone with no other type of computing device	283,357	+/-6,468	8.6%	+/-0.3
Tablet or other portable wireless computer	1,585,969	+/-16,108	62.1%	+/-0.6
Tablet or other portable wireless computer with no other type of computing device	21,069	+/-2,263	0.8%	+/-0.1
Other computer	77,136	+/-5,355	3.0%	+/-0.2
Other computer with no other type of computing device	701	+/-370	0.0%	+/-0.1
No computer	197,939	+/-6,747	7.8%	+/-0.3
TYPE OF INTERNET SUBSCRIPTIONS				
With an Internet subscription:	2,196,279	+/-13,326	86.0%	+/-0.3
Dial-up with no other type of Internet subscription	8,785	+/-1,257	0.3%	+/-0.1
Broadband of any type	2,187,494	+/-13,243	85.7%	+/-0.3
Cellular data plan	1,856,353	+/-16,190	72.7%	+/-0.5
Cellular data plan with no other type of Internet subscription	308,311	+/-6,281	12.1%	+/-0.3
Broadband such as cable, fiber optic or DSL	1,764,668	+/-12,569	69.1%	+/-0.4
Satellite Internet service	217,848	+/-7,124	8.5%	+/-0.3
Without an Internet subscription	356,693	+/-8,260	14.0%	+/-0.3
HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2017 INFLATION-ADJUSTED DOLLARS)				
Less than $20,000	395,883	+/-9,853	(X)	(X)
With dial-up Internet subscription alone	2,386	+/-707	0.6%	+/-0.2
With a broadband Internet subscription	257,831	+/-8,548	65.1%	+/-1.3
Without an Internet subscription	135,664	+/-5,786	34.3%	+/-1.3
$20,000 to $74,999	1,209,934	+/-15,577	(X)	(X)
With dial-up Internet subscription alone	5,483	+/-1,155	0.5%	+/-0.1
With a broadband Internet subscription	1,022,598	+/-16,450	84.5%	+/-0.6
Without an Internet subscription	181,855	+/-6,164	15.0%	+/-0.5
$75,000 or more	947,155	+/-10,473	(X)	(X)
With dial-up Internet subscription alone	914	+/-373	0.1%	+/-0.1
With a broadband Internet subscription	907,067	+/-10,945	95.8%	+/-0.3
Without an Internet subscription	39,174	+/-3,247	4.1%	+/-0.3

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Put it all together…

AMERICAN COMMUNITY SURVEY
U.S. CENSUS BUREAU

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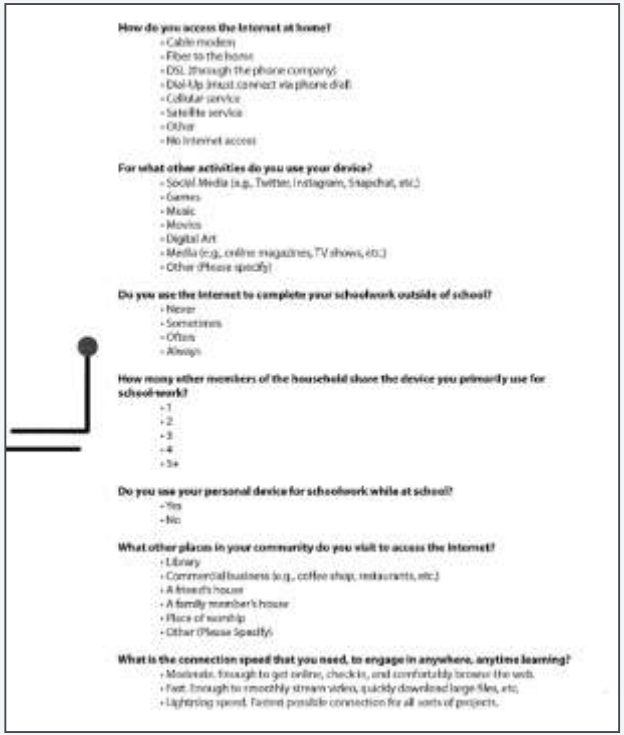
Community Access Surveys



How do you access the Internet at home?
- Cable modem
- Fiber to the home
- DSL (through the phone company)
- Dial-Up (must connect via phone dial)
- Cellular service
- Satellite service
- Other
- No Internet access

For what other activities do you use your device?
- Social Media (e.g., Twitter, Instagram, Snapchat, etc.)
- Games
- Music
- Movies
- Digital Art
- Media (e.g., online magazines, TV shows, etc.)
- Other (Please specify)

Do you use the Internet to complete your schoolwork outside of school?
- Never
- Sometimes
- Often
- Always

How many other members of the household share the device you primarily use for school work?
- 1
- 2
- 3
- 4
- 5+

Do you use your personal device for schoolwork while at school?
- Yes
- No

What other places in your community do you visit to access the Internet?
- Library
- Commercial business (e.g., coffee shop, restaurants, etc.)
- A friend's house
- A family member's house
- Place of worship
- Other (Please Specify)

What is the connection speed that you need, to engage in anywhere, anytime learning?
- Moderate, Enough to get online, check in, and comfortably browse the web.
- Fast, Enough to smoothly stream video, quickly download large files, etc.
- Lightning speed, Fastest possible connection for all sorts of projects.

COSN Action Toolkit: Out of school connectivity survey

How capable do you feel of doing the following things, with 1 being not at all capable and 5 being fully capable?

	1: Not at all capable	2	3	4	5: Fully capable
Turning on a computer, logging on, doing basic tasks					
Uploading content like photos to social media sites					
Blocking spam					
Managing IDs & passwords for online accounts					
Adjusting privacy settings online					
Bookmarking a website or adding it to your favorites					
Comparing sites to check the accuracy of information					
Creating and managing a profile on social media					
Creating your own personal website					
Downloading an app on your cell phone					

Speak Up Fayetteville

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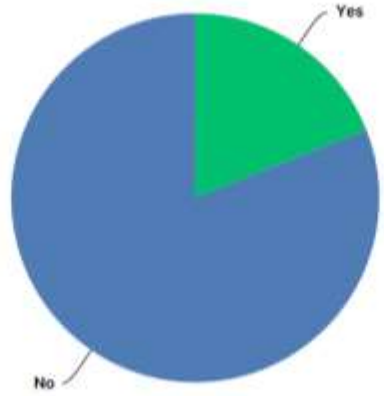
Wi-fi hotspot user surveys

Q4 Does your household currently pay for Internet service?

Answered: 547 Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes	19.01%	104
No	80.99%	443
TOTAL		547

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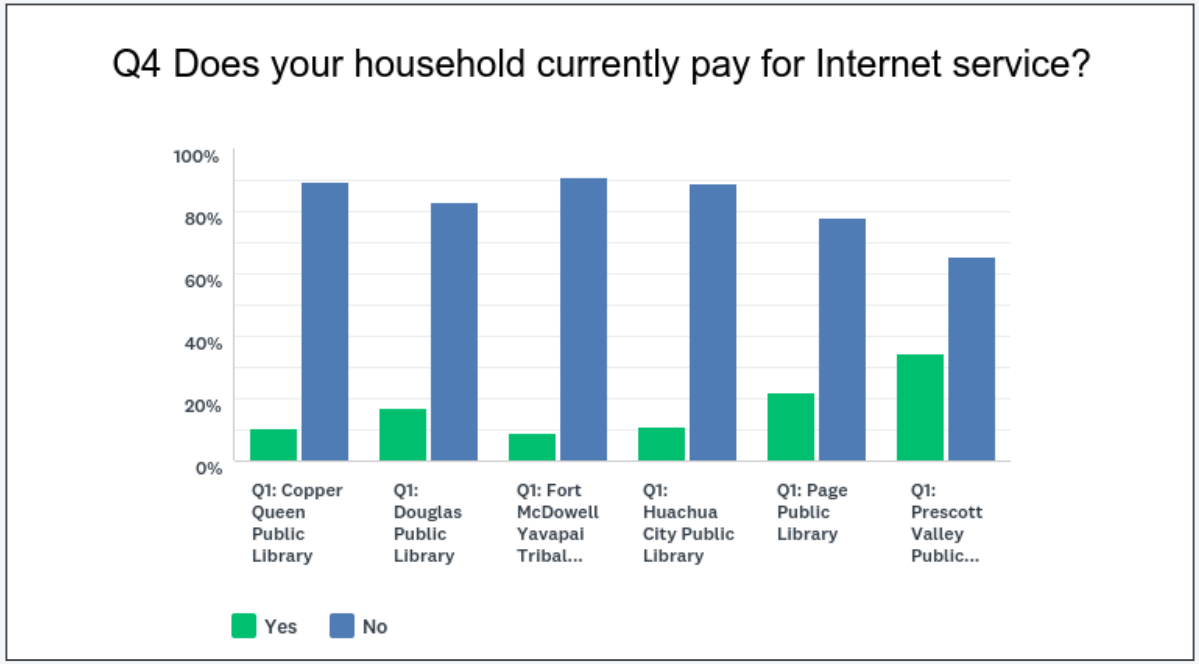
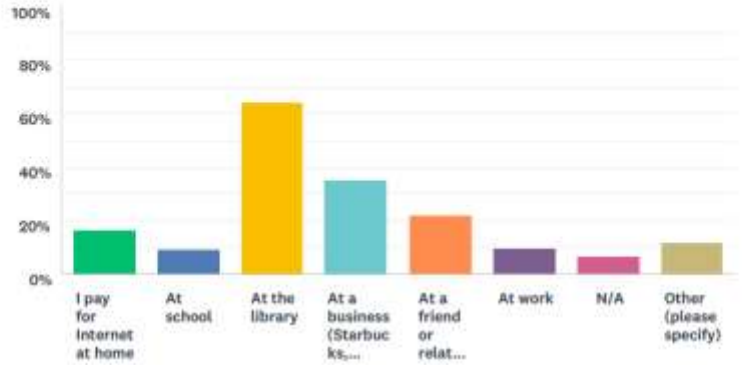
Wi-fi hotspot user surveys



Wi-fi hotspot user surveys

Q8 Without the mobile hotspot, where do you access the Internet?

Answered: 521 Skipped: 28



ANSWER CHOICES	RESPONSES	
I pay for Internet at home	16.51%	86
At school	9.02%	47
At the library	64.11%	334
At a business (Starbucks, McDonald's)	35.12%	183
At a friend or relative's home	22.07%	115
At work	9.40%	49
N/A	6.72%	35
Other (please specify)	11.32%	59
Total Respondents: 521		

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Internet providers & prices

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Low-cost Internet for individuals

connect 2 COMPETE from COX — Low-cost Internet for Low-Income Families

INTERNET ESSENTIALS from Comcast

pcsforpeople

access from AT&T

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Low-cost devices

For libraries & non-profits

techsoup

Mesa, AZ

AZStRUT
Arizona Students Recycling Used Technology

For individuals

connect all
Powered by InterConnection.org

pcsforpeople

Yuma, AZ

REFURBIT.ORG

NATIONAL TRIBAL BROADBAND SUMMIT

Questions or Comments?

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