The Integration of Tor into Library Services: An Appeal to the Core Mission and Values of Libraries

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Abstract

A pressing concern for any library professional today is privacy and security for patrons while using internet resources. One platform that shows promise in promoting privacy and security online is Tor, an anonymous web browser. The platform prevents the theft of user data through advanced networking patterns and holds the capacity to combat censorship and manipulation while strengthening privacy. In advocating for the implementation of Tor in a library setting, it is important to understand how the need for such implementation is support by library mission statements, values, and policy. This article demonstrates how the mission and values of Tor aligns with those of public libraries and advocates for greater adoption of this platform within libraries.

Keywords: Tor, Privacy, Public Libraries, Policy, Anonymity

In the wake of such manipulations of our private data as that of Facebook and Cambridge Analytica in March 2018, a new imperative for user services managers in our libraries is to ensure that users' data is secured while using library technology. Truly the issue has expanded beyond the role of technical services or IT and become a universal concern for libraries. Many libraries have limited resources, both financial and labor, to make any major changes to technology, such as purchasing hardware or software upgrades. The small public library may only have one full-time librarian on staff – if that. Some libraries have no technical managers to provide any support. What cheap and simple solutions are there to preserve the privacy and security of our patrons in these instances?

Tor is a secure distributed network that empowers users to access Internet content with enhanced privacy and freedom. The platform, however, has been controversial in the past for its association with the sensationalized conception of the "dark web," which has overshadowed the benefits the platform could offer to library users. Conception of the core values of librarianship of privacy and security seem to indicate a need for a platform like Tor, but it is unclear the extent to which the mission and values of Tor actually align with those of public libraries. This study, in addition to providing a general introduction to Tor for library professionals and researchers, examines a sample of public library policies to identify language that appears to support the use of Tor.

What is Tor?

Tor (previously known as The Onion Router) is one of a variety of anonymous web networks that exist today. The purpose of these networks is to provide additional anonymity than that available through the regular (surface) Internet. Onion routing involves taking a packet of information (such as the connection between a library patron's computer module and the web

server for the site they are visiting), and adding layers of encryption that anonymizes the connection so that no one along the chain (whether it be an Internet Service Provider, the website, a hacker, etc.) can gather identifying information about the user and his/her behavior (Reed, Syverson, & Goldschlag, 1996; Syverson, Reed, & Goldschlag, 1997; Syverson, Goldschlag, & Reed, 1997; Reed, Syverson, & Goldschlag, 1998; Syverson, Dingledine, & Mathewson, 2004). This is done by sending the connection through a series of relays – special servers on the Tor network that are set-up to route traffic and disguise which computer within the network is sending the request to access the website content (Reed, Syverson, & Goldschlag, 1998; Syverson, Dingledine, & Mathewson, 2004).

On the user's side of Tor, the experience is not much different than using a generic web browser (Internet Explorer, Google Chrome, Firefox, etc.) to access the Internet (indeed, the platform can simply to downloaded like any browser by navigating to its website, torproject.org). Upon clicking on the Tor browser icon, the network will boot up; generally, booting up Tor does take longer than connecting to the Internet, but that is the only major difference. When the Tor browser has booted up, the interface will look very similar to Firefox, which is because Tor is actually designed within the Firefox shell (Syverson, Dingledine, & Mathewson, 2004; Ren & Wu, 2010). From here, users can either travel to any website of the Internet, with the comfort of a little extra privacy, or visit .onion websites. These sites are designed specifically for the Tor platform and cannot be accessed using a traditional web browser like Internet Explorer.

Some Challenges Faced by Tor

Tor is technically a dark web platform. Many of the creators of these platforms have done everything possible to distance themselves from this term and prefer a term like "anonymous web" (used in this article), but nonetheless the history cannot be simply erased. The purpose of

this article is not to convince the reader that everything said about the dark web is false. There are nefarious, illegal activities that occur constantly on the dark web. These range from the sale of illicit drugs and weapons (Claessens et al., 2003; Fu, Abbasi, & Chen, 2010; Jardine, 2015Maddox et al., 2016; Chertoff, 2017), to serving as an anonymous communication platform for terrorists and criminals (Chen, 2007; Xu & Chen, 2008; Gehl, 2016; Harrison, Roberts, & Hernandez-Castro, 2016; Vogt, 2017). The Silk Road, one of the most prominent criminal sites in the history of Tor, brought in over 100 million dollars a year in transactions at its peak (Cristin, 2013). Many of these sites, particularly the ones that rise to prominence, are shut down by the Feds, however new sites inevitably rise up in their place (Chen et al., 2011; Jardine, 2015). Media reports on the dark web skew heavily towards these negative aspects of the dark web (Chen, 2013). Stories about illegal transactions and criminal scheming sell big. The dark web is often played up as a Wild West, with no real redeeming value.

In reality, these negative portrayals of the dark web are one sided and sensationalistic (Beckstrom & Lund, 2019). Crime is far less rampant than some media sources would make it seem. Regardless, the fact that some illegal activity may occur on the dark web should be no major concern to the bonafide seeker of privacy and security. Illegal content exists everywhere on the Internet, including in areas offered on public library computers right now, it is simply how each user utilizes the web that distinguishes the criminal from the lawful. Tor was not designed for crime, just as the Internet in general was not, it was designed to be an ultra-secure and private network. If individuals do not allow exaggerated narratives to scare them away, it can still serve this role for which it was designed.

Benefits of Tor

Tor already has a long history of preserving the anonymity of whistleblowers, victims of political or criminal oppression and violence, and just those who do not appreciate being tracking constantly without their consent. Tor has been used and praised by figures who are generally heralded within the library and information professions, such as Edward Snowden and Aaron Swartz (Jardine, 2015; Gehl, 2016; Taylor, Harrington, & Ward, 2017). SecureDrop (developed by Swartz and colleagues) is a software platform run on Tor that allows for direct communication between whistleblowers and journalists; the platform is currently used by the New Yorker, Washington Post, and the Guardian, among others – journals known for exposing major stories about political and societal corruption in recent years (Sorkin, 2013). The original designer of Tor, the United States Government, intended for it to be a platform for agents in foreign nations and political dissidents to communicate with the U.S. Government – and this is a function that it still serves today (Fang, Liu, & Zhou, 2010; Reed, Syverson, & Goldschlag, 1998).

Comparing Tor to Other Privacy Platforms

If libraries do have concerns about Tor, there are a few other options that, while not as private or secure, can enhance privacy beyond that of traditional web browsers. Brave, a lesser known browser developed by the creator of Firefox, is not an anonymous web browser but does incorporate many strict privacy standards to support users. DuckDuckGo, a search engine, eliminate the filter bubble effect that characterizes major search engines like Google and Bing (Dillahunt, Brooks, & Gulati, 2015). Libraries could set this search engine as the default screen within a secure web browser like Brave to support better privacy practices among patrons.

Shown in Table 1 is a comparison of the privacy features and browsing capabilities of Tor, Brave, and DuckDuckGo. Tor is both the most secure and robust of the three platforms

discussed here, but all three are generally much better choices than a popular web browser like Internet Explorer or Google Chrome.

<INSERT TABLE 1>

Importance of Privacy and Security in Libraries

The importance of privacy in libraries cannot be overstated. Confidentiality/privacy is listed as one of the American Library Association's Core Values of Librarianship (American Library Association, 2018) and is a regularly included as a component in the training of future library and information professionals (Rubin, 2017). As technology rapidly evolves in the Internet Age, dozens of books and articles are published annually on how to preserve privacy (Rubel, 2014; Macrina, 2015; Ard, 2016; Newman & Tijerina, 2017; Childs, 2017; Kritikos & Zimmer, 2017; Caudesch, 2018). With the recent loss of net neutrality, these efforts have only intensified (Adams & Harris, 2018; Golbeck, 2018; Chase, 2019). Internet privacy, however, can be a complex issue – based on the speed of innovation and changing laws and infrastructures – one with which some libraries struggle to keep current (Cranor, 1999; Cesarini, 2007; Rubel, 2014; Marden, 2017). Tor, while imperfect, does provide quick fixes to many of the concerns of rapidly evolving privacy concerns.

Tor in Libraries

There have been encouraging signs in recent years that public libraries may be willing to provide access to Tor as a tool for enhanced privacy. Alison Macrina has been the most vocal figure of late to advocate for the Tor in libraries. Her organization, the Library Freedom Project (https://libraryfreedomproject.org/), provides information about Tor for libraries, and has garnered the support of Edward Snowden for its efforts (Macrina, 2015a; Macrina, 2015b; Kim, 2016; Ard, 2016). The Library Freedom Project played a crucial role in helping Kilton Library

in Lebanon, New Hampshire become the first to host a Tor relay server (Brooks, 2015). Though police in Lebanon ordered that the server be shut down, the library soon reestablished the operation of the server after receiving support of advocates and the library board. Since the Lebanon library started offering access to the anonymous web, several other libraries around the nation have started offering access. The Lewis & Clark Library in Helena, Montana (the library of one of the authors) has been offering the TOR browser on all the public computers in all their branches for several years. Several authors have encouraged use of Tor and related platforms in a variety of public entities, including libraries (Perry, Clark, & Murdoch, 2013; Chertoff & Simon, 2015; Macrina, 2015a).

Evidence from Public Library Mission Statements and Values

The value of mission statements and values for libraries is profound. These documents are designed to guide the decision making of the organization and indicate what ideas/practices are important (Kelsh, 2005; Kuchi, 2006; Salisbury & Griffis, 2014; Wallace, 2004). As such, if alignment exists between the mission and core values for libraries and those of the Tor platform then this provides strong support for the implementation of the technology in public libraries.

To gather further support for the use of Tor in libraries, the authors examined the mission statements and core values from public libraries in the United States. To gather the most diverse range of public libraries, libraries were selected based on the political leanings of the cities in which they are located. Based on the voting outcomes of the 2000-2010 elections, the Tausanovitch and Warsaw (2014) released a list of the most liberal and conservative cities in the United States. Selection of libraries was conducted with the assumption that, if there were to be significant differences in public library policy, it may be reflected in the political leanings of the city (e.g., influencing the composition of the library board). The ten most liberal and most

conservative cities are listed in Table 2 below. The mission statements and core value are included as an appendix to this article.

<INSERT TABLE 2>

The mission statements and core values were examined with the purpose of identifying language that supports the implementation of Tor using a multi-step approach adapted from the work of Krippendorf (1980):

1. Identify – identify segments of text that respond to the research questions

2. Associate – group segments of text together based on semantic relationships

3. Accumulate – code the segments of text based on their shared semantic qualities (e.g., the phrases "privacy is important" and "we need more legislation to protect our privacy" are coded as "promote privacy * 2")

The categories and names of codes were selected to align with the listed objectives of Tor (Tor Project, 2018). The objectives of Tor, as described on its website, are to promote: Privacy, security, censorship circumvention, freedom from tracking, socially-sensitive communication (such as rape survivor chatrooms), political dissidents, expanding internet infrastructure, access to information. In identifying and sorting the language based on these categories, the biggest opportunities, or supporting statements, for the use of Tor in public libraries are revealed.

Seventy-nine (79) unique statements that align with the mission of Tor were identified within the 20 public library mission statements and policies. These statements were coded into five categories, and frequencies of each statement category was compiled. These frequencies are displayed in Table 3 below. The most emphatic category of support was free and open access to information. Given the current state of infrastructure for information flow in the United States, where the end of net neutrality invites Internet Service Providers (ISPs) to pick and choose what

types of content they provide access to, this freedom of access seems to be trending towards greater restriction. Tor is one of a few platforms that can circumvent this control by ISPs and provide unfettered access.

<INSERT TABLE 3>

The categories of language that support the implementation of Tor fit within two broad themes: freedoms of patrons (free and open access to information; maintain privacy; free expression) and connectivity with the world (tools that allow us to connect; support research). These two themes align strongly with three of the American Library Association's four strategic directives (advocacy; information policy; equity, diversity and inclusion), seven of its nine core values (extending and expanding library services in America and around the world; all types of libraries; all librarians working together; an open, inclusive, and collaborative environment; innovating; intellectual freedom; social responsibility), and five of its eight key action areas (advocacy; diversity; equitable access; intellectual freedom; transforming libraries) (American Library Association, 2018).

Discussion

\ In a post-net neutrality world, where the traditional internet can provide neither full access nor freedom from censorship, libraries must embrace new technologies that do provide these freedoms. While Tor presents some new challenges for library systems' administrators, integrating this technology into the library's online offerings is certainly not nearly as complex as migrating to a new integrated library system, or connecting to the Internet in the first place.

Public libraries should consider several factors while integrating Tor into online library services. It is advisable to consult with the library board and any legal counsel associated with the city or library to ensure the library will be protected against any challenges related to the

integration of Tor services. Libraries who receive Federal E-Rate funding may have to consider the implications of implementing TOR. Library content will still need to be filtered for younger Internet users, while Tor can be used more freely by adult patrons (e.g., computers in the adult section may offer Tor while computers designated for younger patrons might not). These factors make the integration of Tor a project deserving of careful planning and execution.

It is possible for libraries to use filtering with Tor. As noted by Beckstrom & Lund (2019), because Tor is built within a Firefox shell, it is capable of running Firefox extensions and programs, like filters. In order to install an add-on like a filter, administrators will need to "run as administrator" the Tor browser and install the add-on (e.g. FoxFilter). However, it should be noted that running any add-ons with Tor can compromise the privacy and security of the browser (e.g., a filter will require permission to access all data for the websites users visit). This may eliminate the purpose of using Tor in the first place – though for children it would still theoretically be more secure than using any traditional browser (e.g., Internet Explorer, Google Chrome).

As with any service a library offers, education should be a primary consideration. Staff should be shown how to use the TOR browser, how to navigate the anonymous web and how to inform patrons. Patron education programs should also focus on how to use the anonymous web, but also to understand the types of online behavior that can expose the user. Periodic review of the anonymous web applications being used to make sure they are up to date is vital. TOR and other anonymous web applications are constantly updating to implement new security and to block new attempts to identify users on the internet.

As a free, easy-to-download web browser, rather than some special hardware or package, Tor is easy to both install and uninstall. Anyone may simply visit https://troproject.org and

download the browser for their operating system. Libraries can easily trial the service and discontinue should they feel inclined; however, it is unlikely such a need would ever arise. Generally, the biggest step is for libraries to adopt the technology; once it is adopted, challenges are rare (Beckstrom & Lund, 2019).

If libraries have a global view of their role, they may see the value to hosting a Tor relay node (https://blog.torproject.org/new-guide-running-tor-relay), so that those in countries plagued by censorship may be able to use the network to access information where this otherwise would not be possible. The decentralization of the Tor network is what makes it so secure. If there is any weak part of the TOR network, it is the relays attached to the network, especially exit relays that connect the TOR network to the surface web. Since anyone can set up an exit relay, the stability and security of these specialized relays can vary. If libraries can host more relays, this will strengthen and stabilize the whole TOR network. Libraries generally have the bandwidth to support the traffic that would be seen as a node on the network. However, this may be a later step after initial experimentation with the browser.

Conclusion

In an age where it has become increasingly difficult to preserve the privacy of patrons and provide them access to satisfy their information need, Tor is one of only a few platforms that may ensure these rights. Libraries and users must decide both personally and as a collective whether a platform like Tor is appropriate for their situation, but this study indicates that, at least, Tor's mission and values align very strongly with those of public libraries. This technology should receive discussion among all library administrators, information technology/systems administrators, and boards as one way to extend the library's mission online.

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Table 1. Comparison of Tor, Brave, and DuckDuckGo

Platform	Privacy Measures Employed	Relative Security (Ranking)	Capabilities/Robustness
Tor	Relays web traffic through a distributed network that conceals users' identity and prevents surveillance and ad/web tracking	1	Complete web browser built within Firefox shell
Brave	Built-in ad and website tracking blocker	2	Complete web browser; lacks decentralized distribution of Tor
DuckDuckGo	Does not track users' search behavior, increasing their privacy and avoiding the creation of "filter bubbles"	3	Search engine – does not provide enhanced security once a user navigates to an external website

Table 2. Ten Most Liberal and Conservative Cities (Tausanovitch & Warshaw, 2014), Used to Select Sample of Libraries

Ten Most Liberal	Ten Most Conservative
San Francisco, CA	Mesa, AZ
Washington, DC	Oklahoma City, OK
Seattle, WA	Virginia Beach, VA
Oakland, CA	Colorado Springs, CO
Boston, MA	Jacksonville, FL
Minneapolis, MN	Arlington, TX
Detroit, MI	Anaheim, CA
New York, NY	Omaha, NE
Buffalo, NY	Tulsa, OK
Baltimore, MD	Aurora, CO

Table 3. Categories of Language that Support Use of Tor in Public Libraries

Category	Frequency
Provides Free and Open Access to Information	31

Appendix. Public Library Mission Statements

San Francisco Public Library

The San Francisco Public Library system is dedicated to free and equal access to information, knowledge, independent learning and the joys of reading for our diverse community.

Washington, D.C. Public Library

The District of Columbia Public Library is a vibrant center of activity for residents and visitors in the nation's capital. The library provides environments that invite reading, learning and community discussion and equips people to learn all their lives, to embrace diversity and to build a thriving city. We are proud to be a recognized force in the community for engaging the mind, expanding opportunities and elevating the quality of life.

Seattle Public Library

At The Seattle Public Library, we see Seattle as a city where imagination and opportunity thrive. Our mission is to bring people, information and ideas together to enrich lives and build community.

Oakland Public Library

Your Oakland Public Library empowers all people to explore, connect, and grow.

The Oakland Public Library values...

- Diversity
- Equity
- Community
- Responsive Service
- Adaptability
- Empowerment
- Joy

Boston Public Library

The mission of the Library is focused on four core areas: reading and literacy, spaces and programs, reference and instruction, and special collections and cultural heritage. Our commitment to be 'Free to All' is carved into the façade of the Central Library in Copley Square, and we are proud to welcome everyone equally regardless of gender, race, national origin, sexual orientation, faith, or economic status.

Minneapolis Public Library

The mission of the Minneapolis Public Library was to link people in the City and beyond with the transforming power of knowledge. An essential public institution for the active exercise of democracy and intellectual freedom, the library helped work toward a future where:

- people of all ages successfully navigated information for work, study, and play;

- the City, its businesses, and residents prosper;
- each library is a vital center in dynamic and diverse neighborhoods;
- cultural life is rich and varied;
- literacy is widespread; and
- everyone is enlivened by the joy of discovery, reading, and lifelong learning.

Detroit Public Library

The Detroit Public Library enlightens and empowers people by providing diverse and dynamic pathways to literacy and learning.

New York Public Library

The mission of The New York Public Library is to inspire lifelong learning, advance knowledge, and strengthen our communities.

To deliver on this promise, we rely on three great resources—our staff, our collections, and our physical and digital spaces—to provide opportunities for learning and growth to all New Yorkers.

1. We inspire lifelong learning by creating more able learners and researchers. We:

- Teach learning and information-navigation skills
- Provide tools, resources, and great places to work
- Engage in great exploratory conversations
- Ask and answer questions that encourage patrons to challenge their assumptions
- Support creativity, research, and problem-solving
- Bring people together to spark creative synergies and learn from each other

2. We advance knowledge by providing free and open access to materials and information that reflect New York's global perspective. We:

- Identify, acquire, and preserve items that enhance our unique areas of expertise
- Connect with other organizations whose materials complement our own
- Inspire interest, expand horizons, and enrich perspectives
- Build tools that allow us to connect with the world in our areas of expertise

3. We strengthen our communities by promoting full citizenship and participation in society. We:

- Promote the development of key skills and capabilities
- Provide dynamic resources to help patrons understand and engage in society
- Create safe and reliable places where we and our patrons can enjoy, honor, celebrate, and engage with our communities
- Offer unique and authoritative materials of historical importance
- Bring our diverse communities together

Buffalo Public Library

Connecting our diverse community with library resources that enrich, enlighten and entertain.

The Buffalo and Erie County Public Library will:

1. Provide open, equal and free access to information in accordance with the American Library Association's "Library Bill of Rights."
2. Deliver timely, confidential and customer-oriented service to meet the informational, recreational and educational needs of the community.
3. Promote lifelong learning by encouraging all children and adults in their enjoyment of reading and discovery.
4. Contribute to the region's economic vitality by assisting individuals, businesses and government as they pursue better jobs and economic growth.
5. Create and maintain an environment that attracts, develops and encourages a diverse and skilled staff.
6. Listen to the entire community in pursuit of the Library's Mission.
7. Manage resources effectively and be accountable to its funding sources.
8. Pursue the private and public funding necessary to fulfill the Library's Mission.

Baltimore (Enoch Pratt) Public Library

The mission of the Enoch Pratt Free Library is to provide equal access to information, resources, staff and facilities and enrich all citizens of Baltimore and other residents of Maryland who pursue knowledge, education, lifelong learning opportunities and cultural enrichment.

Mesa Public Library

By providing access and guidance to information, services, and resources, the Mesa Public Library expands minds, empowers individuals, and enriches our diverse community.

Oklahoma City (Metropolitan) Public Library

We grow smarter communities, one person at a time.

Values:

- Library customers first
- Integrity and trust in us and by us
- Respect for customers and each other
- Freedom to learn
- Commitment to learning as enjoyment
- Individual growth and organizational development

Virginia Beach Public Library

The mission of the Virginia Beach Public Libraries provide diverse opportunities for learning and gathering that promote personal fulfillment, self-reliance and a sense of community, provide free and convenient access to accurate and current information and materials, and promote reading as a critical life skill and enjoyable activity for the entire Virginia Beach community.

Colorado Springs (Pikes Peak) Public Library

Providing resources and opportunities that impact individual lives and build community.

Jacksonville (FL) Public Library

To enrich lives, build community, and foster success by bringing people, information, and ideas together.

Core Values

- Service: We are dedicated to making a positive difference in people's lives.

- Teamwork: Life is better when we work together.

- Excellence: We settle for nothing less than the highest quality outcomes.

- Innovation: We prize creativity, flexibility, imagination, and fresh ideas.

Guiding Principle

Intellectual freedom is "the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive, and impart information and ideas." The following commitments derive from our support of that principle:

- JPL provides all people access to resources and services without discrimination.

- JPL provides materials and information representing divergent points of view on a wide range of issues.

- JPL respects the confidentiality of its customers.

- JPL supports the American Library Association's "Library Bill of Rights."

Arlington (TX) Public Library

Our mission: To open doors to a world of ideas, information, and imagination, thereby enhancing the economic, social, and cultural vitality of our diverse community.

To guide our work with each other and with the community, we value:

- Responsive customer service
- Learning opportunities for all ages
- Our community's diversity
- Welcoming physical and virtual environments
- Teamwork and community partnership
- Introducing children and adults to the joys and rewards of reading
- Customer confidentiality
- Technology that enhances our vision
- Bringing library resources into the community
- Integrity and accountability

Anaheim Public Library

Anaheim Public Library promotes literacy, lifelong learning, and a love of reading through traditional print materials as well as virtual services. Our mission is to promote information through programming

and engage our community while providing a safe space for the diverse members of Anaheim to share, thrive, explore, create, enjoy, honor, celebrate, and engage with one another.

Omaha Public Library

Omaha Public Library strengthens our communities by connecting people with ideas, information and innovative services.

Our Core Values:

- Service excellence
- Integrity
- Innovation
- Community engagement
- Equal and inclusive access
- Staff talent

Tulsa Public Library

Goals

1. Promote Lifelong Learning and Literacy in all Forms
   Through collections and programs, increase the access by Tulsa residents to the intellectual content of our culture, allowing them to pursue their own learning and interests, and fully engage in our society.
2. Contribute to Stronger Communities
   Through the further development and deployment of new, 21st century library service models, contribute to the civic and economic development of our communities.
3. Cultivate Engaged Employees
   Build an irresistible organization by attracting, recruiting, growing and retaining an engaged workforce.

Aurora (CO) Public Library

Live. Learn. Achieve. The mission of the Aurora Public Library (APL) is to provide the citizens of Aurora with books, information and other resources in a positive and proactive manner.

Values:

The foundation of democracy is the "freedom to know" and a public library is an essential service, one cornerstone of that foundation, and should be guided by the following values:

1. Ensuring free, equal and confidential access to the library's core information resources and services.
2. Promoting the development of independent thinkers and literate people.
3. Creating a welcoming environment to promote a sense of community.
4. Making available appropriate technology and new resources to meet changing information needs.
5. Providing access to a broad spectrum of ideas, reflecting diverse cultures and points of view.
6. Enhancing the cultural needs of the community.