



**GUARDIAN
PROJECT**
<https://guardianproject.info>



May 2023

Improving Usability of Tor on Smartphones in Latin America

v0.0.2

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Executive Summary

Between 2022 and 2023 Guardian Project, with support from Okthanks and the Tor Project, organized and participated in a total of **12 workshops** in Ecuador, Mexico and Brazil with the participation of **161 people**. The workshops focused both on the broad topic of “Tor for Smartphones”, while also taking deeper dives into specific topics like virtual private networks (VPNs) and anonymous web browsing. Through a variety of methods, we gathered feedback from the participants in each of those sessions. We also ran detailed individual tests with volunteers to collect insights related to new features and usability improvements on specific apps.

Our top takeaways from this process were, as follows:

- ***Changing Misconceptions of Performance*** A positive outcome of each workshop was the opportunity to show participants how much has the Tor network speed improved and address misconceptions related to downloading files and watching videos, one of the main reasons why users stopped using Tor in the past.
- ***Ease of Onboarding Matters*** When working with at-risk individuals, it's important for the first experience to be easy and straightforward.
- ***Support Flexible Use*** People's behaviors around using VPNs tend to vary. Many will use it in certain situations. They are not running it all of the time for everything, but only when they need it.
- ***Consider Physical Security*** One of the high-level threats we identified during the workshops we ran was the existence of physical check-points run by drug cartels in the south of Mexico. People entering or leaving an area are asked either to provide access to their phones for review or leave them at the checkpoint until they leave the area. It is not clear what they are looking for when they get access to a device, but in many cases, people who left their devices at the checkpoint do not return to claim them out of fear. For this reason, we encourage the use of app icon camouflage features on privacy and security focused apps.
- ***Awareness and Education*** The primary reason people in Latin America have been slow to adopt Tor tools is not that they do not work in their context, but due to awareness they exist. They have a hard time understanding what they do and how they work, and have many misconceptions about them. Continued outreach and education about which tools to use when is needed to increase adoption.



Mexico City Workshop, Fall 2022

**Participants in this workshop agreed to take a group picture to document the event and gave their permission for us to publicly share it.*



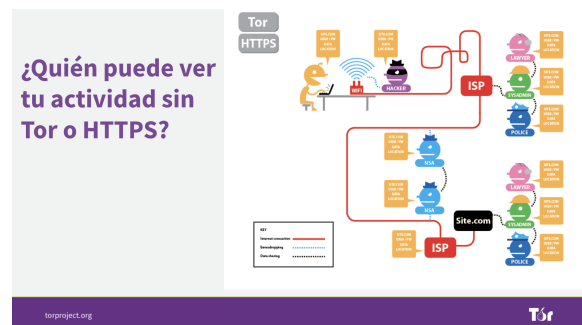
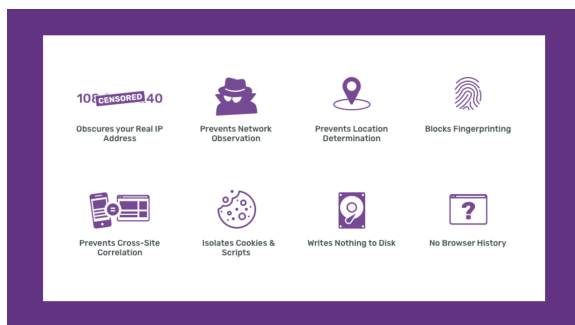
Chiapas Workshop, Spring 2023

Workshop Materials

Throughout the duration of this work, a series of localized training materials were produced to fit the specific needs of each region and show recent developments in the project.

Presentation “Tor for Mobile Phones”

This was a general overview of all Tor-enabled software available for Android and iOS smartphones. We used this to gauge interest and experience with using Tor for different needs. The full presentation is [available for download](#).



Presentation: “Onion Browser for iOS”

While most members of the communities we worked used more affordable Android devices, there was still a significant presence of iPhones. This tends to be true for journalists or more senior NGO staff, who have interest and resources to pay for what they consider “better security” or a “better camera”. With this in mind, we included iOS apps in our presentations and workshops. The full presentation on Onion Browser for iOS is [available for download](#).



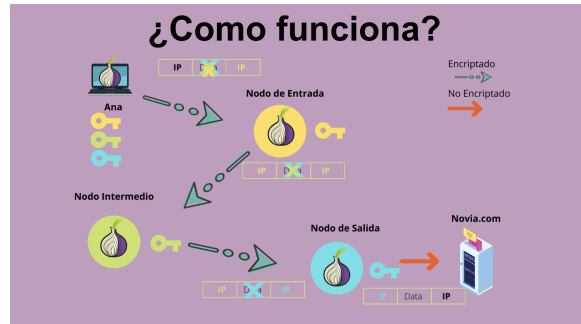
Onion Browser

Tu conexión confiable a Tor desde iOS

Desarrollado por:

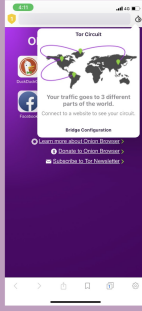


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Onion Browser tiene la función de Puentes incorporada, que te permite conectarse a Tor cuando tu proveedor de servicios lo bloquea. Para habilitarlo sigue estos pasos:

1. Abre Onion Browser
2. Ve al icono de la cebolla de arriba a la derecha
3. Selecciona "Configurar Puentes"



¿Qué hago si Tor está Bloqueado?



Presentation: "Anonymity and Privacy"

We covered the important topics related to the basics of network privacy, security, and anonymity, and VPNs. The full presentation is [available for download](#).

Taller de Redes y anonimidad

- Bienvenida
- Introducciones
- El juego de las sillas + Fortaleciendo tu privacidad
- Pruebas con los nuevos diseños de Orbot
- Entrenamientos
- Preguntas y respuestas

Codigo Abierto

Mas rapido se lo que te imaginas

1
VPN de Orbot paso 1:
Activa el VPN

2
Pregunta (escribe la respuesta en un Post-it)
Como estas protegido?

Orbot como VPN

Grupos de 3

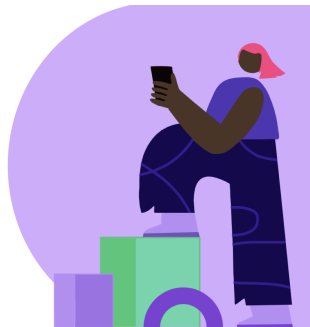
Presentation: "Orbot for Mobile Devices"

The slide deck created for the last round of workshops featured the improved user experience of the Orbot app and addressed misconceptions and concerns that we identified during previous workshops. The full presentation on Orbot Improvements is [available for download](#).

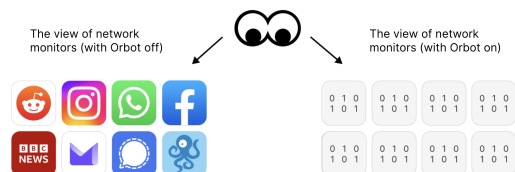
Get More Privacy on Your Phone

An introduction to Orbot and Tor

Fabiola, support@guardianproject.info



Orbot's Privacy Promise: Reduce Tracking



So you want to use Orbot to get around blocking?

You can! It will keep you connected to your favorite apps and services, even if they are blocked.

When To Use Orbot

- I want peace of mind. I want to reduce how much the government can 'watch' me.
- I don't want monitors to know that I'm using certain apps.
- I want to use apps that are blocked.

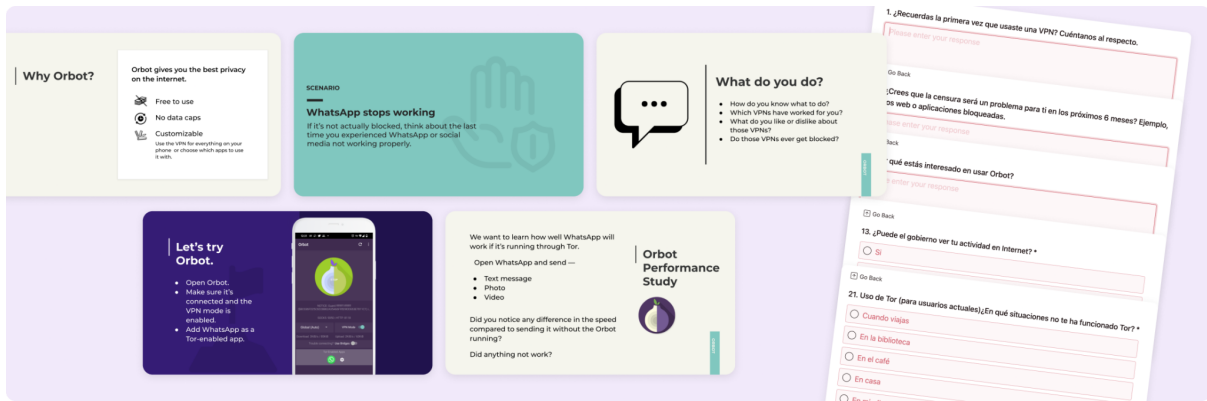


Feedback Methods

The training workshop series ran from March 2022 through May 2023. Throughout that time, we used different methods to open up discussions and measure comprehension and usability.

Phase 1: Learning Context & Performance

The usability sessions in the first phase of the project were centered on testing the current speed and performance of Orbot in local contexts. There are many preconceived ideas and experiences that make people believe that Tor is slow. While some latency is expected, the experience someone has using Orbot will vary depending on where they live and what they're using it for.

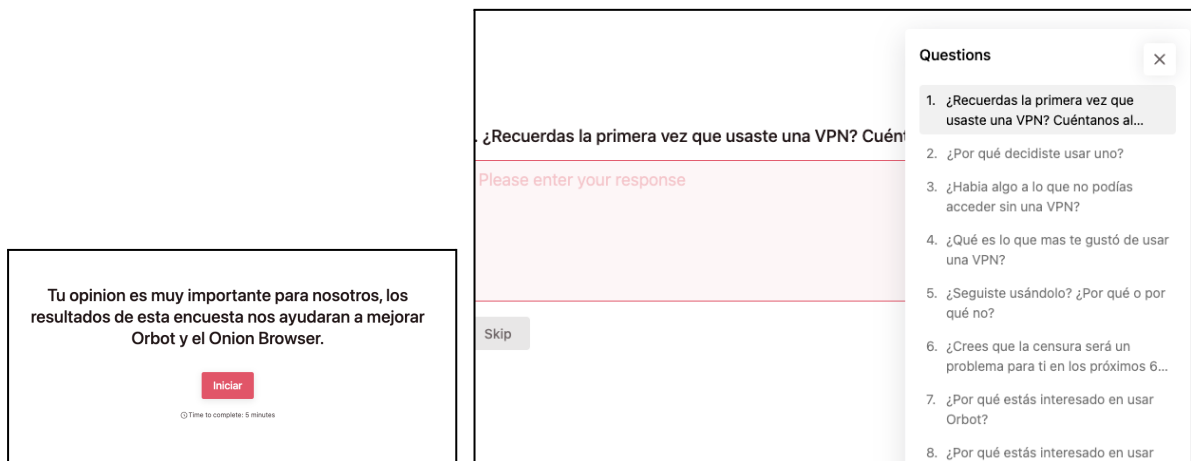


We wanted to have people understand how to measure network performance for themselves. We invited them to run a comparison study. First, they sent various text and multimedia messages over WhatsApp. Then, they enabled Orbot to work with WhatsApp and sent the same text and multimedia messages. Most were surprised that the speed was the same. This is largely due to the asynchronous nature of WhatsApp and that any difference in speed from using the network directly or through Tor is hidden by the app. This helped them understand that using WhatsApp over Tor via Orbot can be very usable, especially if WhatsApp or other messaging apps are blocked or monitored in their area.

We also used this study as an opportunity to get feedback on the existing onboarding process and start interface. Some users complained that it took too long to install and run Orbot. In the new design update, we've minimized the steps to get started to remove the friction of 'too many steps'.

For additional insight into our approach with this work, you can view and use the slide decks used to guide the [Orbot Performance Study](#).

In concert with the in-person usability study, we invited training participants to contribute to an online survey. You can view the survey in [Spanish here](#) and see some of the questions and interface below.



Our aim was to get more familiar with the different contexts people are operating in, along with their awareness and interest in using VPNs and Tor tools. The last section of the survey focused on questions for existing Tor users, so that we could better understand existing pain points. It was sent out to 38 people across 3 countries. View the [full survey in Spanish online](#).

Below are some highlight quotes from participants in the survey.

Reasons to Use Tor Tools

“My country is getting more and more difficult and insecure, especially as I am a woman activist.”

“More than censorship, I consider government espionage or that of groups interested in blocking journalistic activities an issue.”

“I use a VPN for security reasons. I like being able to disguise the IP of my computer. I use it frequently for my journal activities.”

Why are you interested in using Orbot?

“To speak with the truth without fear of reprisals.”

“I want to continue the free exchange of information.”

“To be able to take privacy to my mobile.”

“To search for information about violations of human rights in a safe way”

“I like to decide which applications on my cell phone can make more private connections when needed.”

“To protect data of organizations and persons of human rights with the work I do.”

“To bring protection and privacy to my mobile.”

“To protect my information, I'm a photojournalist”

Why are you interested in using a Tor-based Web Browser app?

“My place of work has censorship of many things”

“So that I don't have the contents that I'm looking for don't appear, but it's important to keep the security inside the work that is being carried out”

“To carry out anonymous searches or avoid censorship measures when I don't have a computer at hand”

“Because I use it to communicate with human rights defenders”

“Increase my anonymity and privacy also on mobile”

“Search my interests without being collated with publicity without my personal information available”

“I want to protect some sensitive information, and minimize network exposure risks”

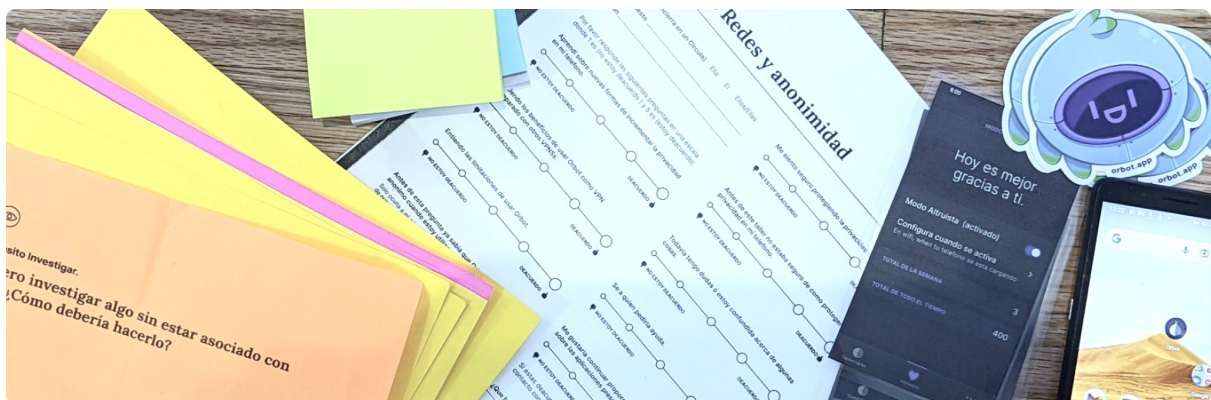
“I feel some anxiety about surveillance in the country”

“I want to access a website that you would like to omit to the internet provider”

“In addition to security, I want to learn more about the Internet and other networks. I want to get out of the herd logic we live in.”

Phase 2: Feedback on Design Concepts

About midway through the project we had new designs to test during in-person workshops. Due to the amount of misconceptions about Tor and the steep learning curve for newcomers, we decided to focus the usability feedback on measuring comprehension.



Hot Potato (Or Plushie Toss)

At the beginning of the workshop we ran a short 15-20 minute activity to learn how people are currently responding to situations we had heard about in the survey from phase 1. The scenarios we used included:

- I'm at a cafe. I want to look something up while connected to an open wifi network. How do I do this safely?
- I'm working on a contentious story. I feel anxious. I want to ensure my personal safety while I'm working on this story. How do I protect my personal privacy when using my phone?
- I'm packing for a trip. I want to make sure I can stay connected to the apps and people I interact with regularly. How do I make sure I will have safe access while I'm traveling?
- I have a question. I want to look something up, but don't want ads following me around. Which browser or browser settings should I use?
- I'm researching. I opened an independent media site and it won't load. How do I get it to work?
- I'm working on campus. I know that some websites and services online are blocked. How can I safely access them?
- I need to search. I want to look something up without being associated with it. How should I do it?
- Write your own...

This activity was fun! We were able to be outside, and mimicked the game of [Hot Potato](#). Even more, it helped provide a baseline understanding of how people think about and respond to various scenarios before the workshop started. At the end of the workshop, and after a full training on the Tor Network and hand-ons testing with Orbot, we returned to the scenarios. We asked people, again, to share how they might respond after learning what was taught in the workshop.

Paper Prototypes

Paper prototypes are printed versions of an interface. We used them during this workshop for our second learning activity. Participants also had access to a version of the Android app that had many of the new design features implemented. Because participants were dealing with paper and in a group with others, we found that the activity led to a lot of discussion. We tested 2 interfaces. One at a time. Each had a prompt.

Home Screen: Participants were asked to activate the VPN, then respond to the question, "How are you protected?"

Kindness Mode: Participants were asked to activate kindness mode, then respond to the question, "When would you run kindness mode?"

Participants wrote their answers down on a sticky note so they could be shared with the full group, and used to find common themes.

Feedback Highlights:

- When asked how activating the VPN mode in Orbot would protect them most of the answers were similar and related to their knowledge of conventional VPNs, those participants learning about the advantages of using Orbot instead was interesting and we heard many positive comments about it.
- For new Tor users understanding how adopting Tor tools can enhance their privacy when using the internet was a valuable lesson.

"I used Tor in the past and always thought VPNs were better because they are faster, now you can not really tell the difference, the Tor network has improved a lot". - *Journalist from Mexico City.*

"My organization provides a paid VPN for all members, I never stopped to think that by paying for a service they have access to the name of our organization, bank account number, location, and so on". - *Activist from Mexico City.*

"Thanks for teaching us about the difference between decentralized and centralized digital tools, we will be looking into adopting more decentralized tools in the future." - *Journalist from Chiapas.*

- One of the subjects that participants in the workshops were more interested in was the Kindness Mode feature for two reasons, first, it helped them better understand how the Tor network works and why they can trust it, the second, the ability to become part of the Tor network as a SnowFlake proxy to help others in a seamless way was very attractive to the ones with unlimited data or access to a reliable WiFi network.

End of Training Survey

After the session, we invited participants to [complete a short survey](#). We decided to print these to remove the friction of having to remember or to open a link on their phones. The questions helped us get an idea about if users walked away with more confidence, if they had outstanding questions, if they knew where to get help and if they were interested in being involved in future studies.

POST EVENT SURVEY

Workshop on Networks and Anonymity



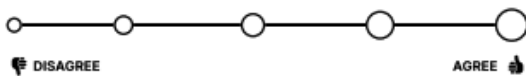
Pronoun (circle one) she/her he/him they/them

Job/role _____

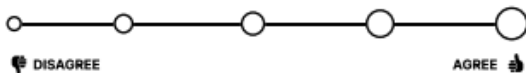
Region _____

Please answer the following questions on a scale of 1 (disagree) to 5 (agree).

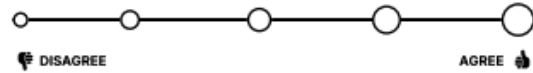
I learned new ways to boost my privacy on my phone.



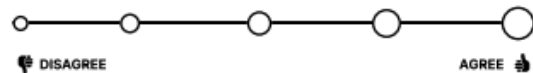
I understand the benefits of using Orbot as a VPN compared to other VPNs.



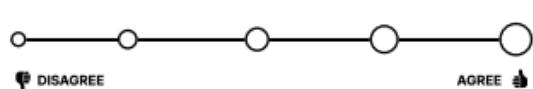
I feel comfortable protecting my privacy on my phone.



Before the workshop, I was unsure about how to protect my privacy on my phone.



I still have questions or am confused about something.



You can [download the survey PDF file](#).

Phase 3: Verifying Usability Improvements

Toward the end of the project, we had designs implemented, and wanted to understand how intuitive the app was for users. We used a semi-structured usability test that could be self-run or facilitated by a researcher. We created Usability Cue Cards to walk participants through the exercise. The front side of a card has a goal; either:

- I want more privacy on my phone; or
- I want to stay connected to apps that recently stopped working due to censorship.

Individuals were first asked to choose the card with the goal that was more important to them. The backside of the card gives the participant a challenge related to the goal. They were asked to use the Orbot app and respond to the prompts that followed. Here are some examples of the prompts:

- Say your challenge out loud. Then record your thoughts as you use the app to accomplish it.
- From the main view of the app, what do you want to do next?
- Show how you would configure Orbot to work with only WhatsApp.
- After using the app, what questions do you have?
- What would you improve?



The Usability Cue Cards we used for this activity are [available for download](#) in Spanish.

The focus of this study was to measure the usability improvements with the latest test version of Orbot. We wanted to learn if the technical difficulties or usability issues people experienced previously would now be reduced or gone.

Because awareness building and education had continued as a key theme throughout the project, we also used this opportunity to measure user comprehension. We included the following prompts on the Cue Cards:

- Based on your understanding of Orbot and how you have it configured, please describe who Orbot protects you against. What problems can be avoided by using this technology?
- In what scenarios would Orbot benefit you? If you feel it's not feasible for you, please explain why.

For the [curriculum](#) for this phase of training, we put more of an emphasis on the direct benefits and uses of Orbot. We were also mindful of the scenarios in which other Tor tools are recommended.

Feedback Highlights:

- Participants liked the caption “Hide apps from network monitoring and get access when they are blocked.” They agreed it makes it very clear to new users what Orbot can do for them.
- They also loved the animated Orbie and the way the different faces show when the app is off, when the app is trying to connect, and when the app is connected.
- There were a few comments about the “Change Exit” feature on the main screen of the app. First participants did not know what that referred to even after the Tor session. When explained, they understood and many of them gave examples of how and when they could use it. They agreed that for new Tor users and non-technical people the words “Change Exit” are not enough to

explain the feature. A longer sentence in that section is needed. Something like “Choose the location you want to make others believe you are coming from.”

- Understanding how Tor circuits work made the “Refresh” feature exciting and important for some groups.
- It was interesting to compare which apps each person chose to run under the VPN depending on what they considered important. Many of them selected their bank apps and then we had to clarify that those won't work when running through Tor.
- A comment that many people agreed on was the fact that we are advocating for privacy and on the recommended apps list we are showing social media apps, they suggested we remove those from the list.
- Some participants found the app too complex for new users even after they had a workshop about Tor and Tor tools the same day. They both agreed that the app needs a user guide or prompts to show users what each feature is for.

Outcomes

Localized Personas and User Stories

We developed three new personas for Latin America representing three typical members of the communities we were seeking to assist. These personas profiles were created to generate an understanding of the countries in the scope of this project context in regard to user needs for privacy and circumvention tools. They are helpful for product design and development teams to keep specific kinds of users and needs in mind. [View the full persona profiles here.](#)

To create each persona profile in this report we combined information obtained from the feedback surveys, participants in workshops as well as the context in the region with the purpose of helping the development and design teams better understand the needs, capabilities, and limitations of prospective users.

Gregorio - Chiapas, Mexico

Journalist exposing corruption and drug cartels activities

As a journalist working for the main media outlet in my state, I want to be able to do research, send and receive information and communicate with my sources without leaving track of my activities to protect myself and my contacts from the people and groups I'm exposing in my articles.

Claudia - Chiapas, Mexico

Human Rights Defender mapping territories occupied by guerrilla forces

As a Human Rights Defender, I want to map the territories that have been occupied by guerrilla forces so that I can help the indigenous communities living in those areas to get assistance from the government to recover their territories.

Federica - Mexico City

Independent Journalist and feminist focused on publishing articles about gender violence, and gender inequality.

As a feminist and a journalist, I want to be able to inform my society about the injustices against females in my city hoping that by bringing attention to this very common problem in Mexico the mentality of the society I live in will start to change and see females as equals.

Pain Points Identified

The following list represents feedback voiced throughout the full term of the training and research. We have labeled them High, Medium, or Low based on potential impact and priority.

1. Confusion about the sequence of steps they have to follow to use the VPN mode in the app. **High**
2. References of Social Media blocking accounts when users try to access using Tor. **Low**
3. Uncertainty about the legal implications of using Tor. **Medium**
4. Concerns about who is funding the Tor Network. **Medium**
5. Even though it is happening, users in Mexico are not familiar with censorship, and internet shutdowns, when it happens the only assume it is a problem with the tool they are using or a peak hour, for the first case they try using a different tool, instead of adopting a circumvention tool, for the second case they opt to connect a very late hours at night or very early in the morning. **Medium**
6. Internet access is expensive, unreliable and monitored by many bad actors in that area. **High**
7. A lot of people only have access to the internet by connecting to open networks that profit from the information they obtain from people connected to their Wifi. **High**
8. People who can afford data plans do not have access to it all of the time. The service fails during times when many users are trying to connect at the same time. **Low**
9. It is also known that internet service providers sell users' information to third parties for a profit. **High**
10. Targeted advertising is very common and bold. Users are forced to see the advertising before they have access to the information they are looking for, and often other websites have more advertisements than the actual information on the page. **High**

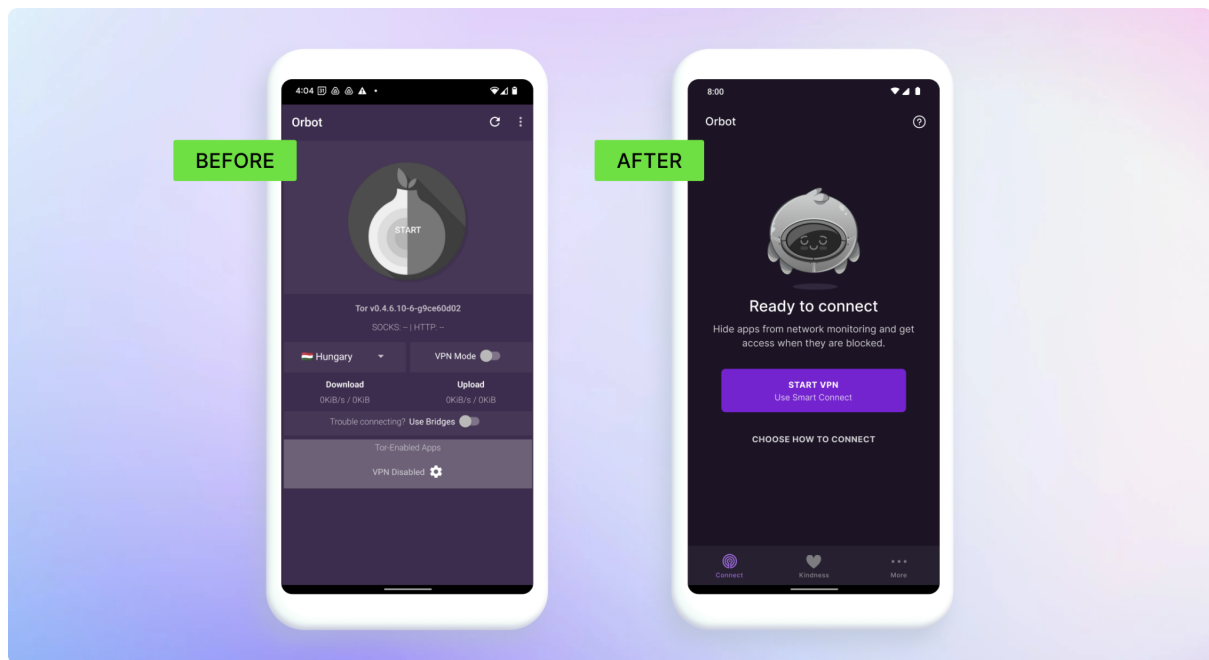
11. When people see social media logos within Tor tools, they are confused because the social media apps do not promote privacy, and Tor tools are about privacy. **Low**
12. Many participants in this workshop have heard about Tor before, and some had used Tor in the past, before it was optimized to be more efficient and faster, and they haven't used it since. Very few were current Tor users and assumed Tor was only a Browser. **Medium**
13. People joining sessions online and in person wonder why they should trust the trainers and the information provided during the sessions, especially when they meet the trainers for the very first time in the session. **Medium**
14. People in Mexico are not aware of Censorship events because they are not common, they are brief and they are not being documented. **Medium**
15. The activist who translated the app to Nahuatl pointed out that the next step to promote the adoption of the app among communities that speak Nahuatl is to translate the training materials she saw at the localization event and find a way to distribute them for her people to understand how important it is to adopt Tor tools when using open networks. **Low**
16. Open Wifi networks in Mexico are slow, and so adopting Orbot is a compromise between safety and convenience. **Medium**
17. Two out of the 3 testers found the app too complex for new users even after they had a workshop about Tor and Tor tools the same day. They both agreed that the app needs a user guide or prompts to show users what each feature is for. **Medium**
18. There were misconceptions about what anonymity means when it comes to Tor tools, one tester said "I can not stay anonymous all the time because people need to know about my work" which means she assumed once connected to Tor she wouldn't be able to access her accounts. **Low**
19. Another tester assumed that by selecting Chrome in Orbot's VPN list all the Google apps would run through Tor and went to Google Maps to check his location. **Low**
20. Two testers expressed concerns about the performance on low-end devices, one of them even made the comment that her device had an outdated OS and she wasn't able to install many apps. **Low**
21. They also expressed concerns about the memory space the apps would use in their phones. **Low**
22. Testers identified the need for a "Save Button" on the list of apps screen and a "Back Button" on the "About screen". **Low**

Orbot Usability Improvements

From the learnings of the usability research, the UX design had 3 main objectives.

1. Simplify steps to connect
2. Improve the experience of bridges
3. Accommodate the behavior to use as needed

One: Simplify Steps to Connect



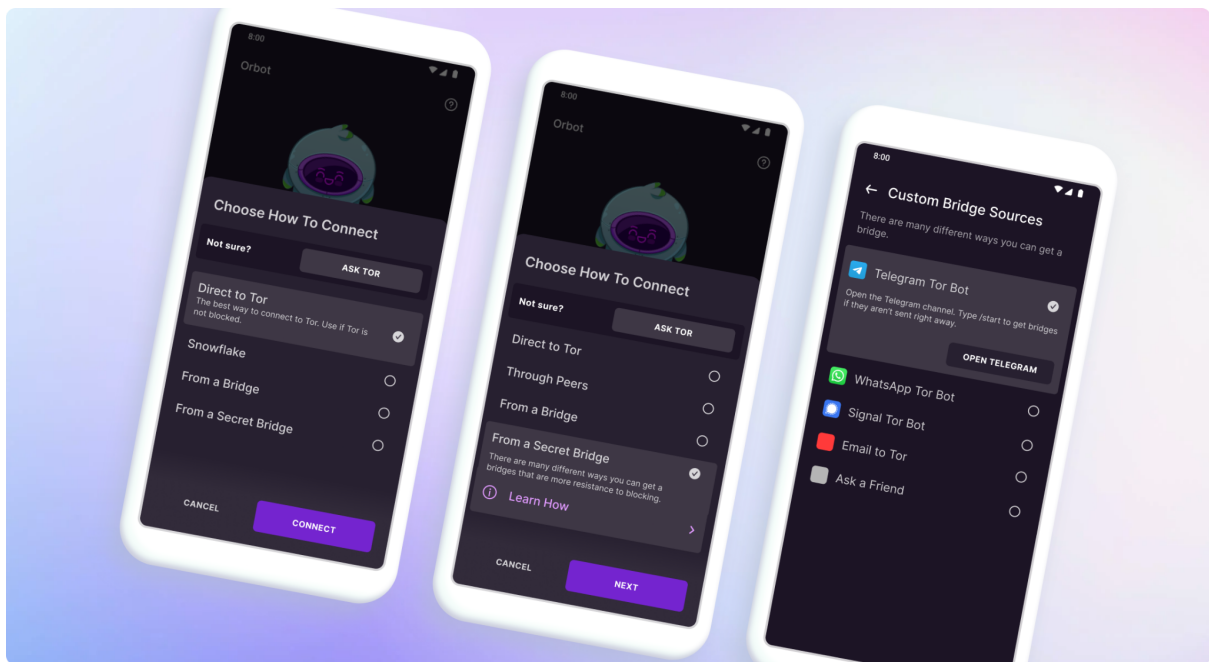
“There are too many steps to get started.” — Brazil, 2022

The biggest change was the first experience and main interface. When working with at-risk individuals, ease of first use is essential. We removed all onboarding steps to reduce the first experience to the main view with one primary action—Start VPN.

Behind the purple button is where the magic happens. Tapping Start VPN will use Smart Connect to find the best connection to Tor for an individual user. Smart connect is a new feature in Orbot that makes it easy to connect, especially in places where tor is blocked. It checks the Tor circumvention API to see if the user can connect directly or if they need a certain type of bridge. This lookup is based on their location. Once it gets an answer, the app will connect to Tor using the recommended method. If it doesn't work for some reason, the app will fall back to try other methods until it finds something that works.

Due to common issues with poor internet connections, we have considered how to handle low latency environments in these workflows.

Two: Improve the Experience of Bridges



One of the most common questions/misconceptions we've heard from users is thinking that using a bridge will make them safer. Many have also asked, "How do I know if I need a bridge?"

We don't want people to have to think about it. Rather to get them connected in the best way possible so they can move on with their day. The new design still offers various options to use bridges. We know there are a handful of people that will want to choose for themselves. Using bridges, however, is now secondary, rather than a top-level choice. Manual bridge selection is accessible from the 'Choose How To Connect' button.

The main goal was to simplify. First smart connect relieves users from needing to see a list of bridges in the first place. Which is awesome. Though we know some Tor fans out there that will want to have access to these options. And we anticipate that some will find themselves here out of curiosity.

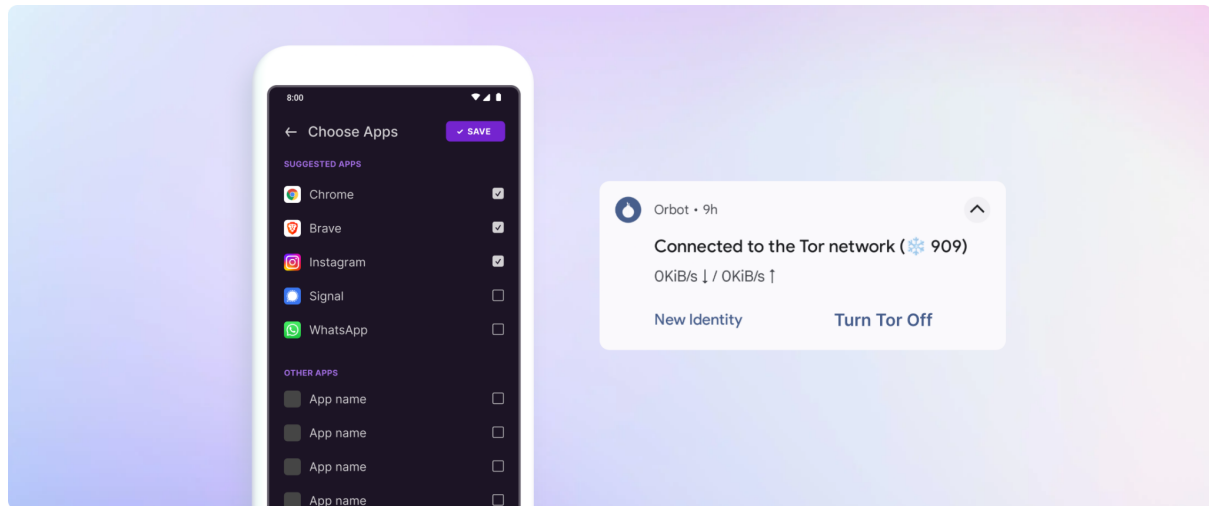
We went through many iterations. And landed with an interface with these qualities.

- Simple language that could be approachable for people who are not familiar with Tor, proxies or VPNs
- Technical terms are included in the descriptions for advanced Tor users.
- Access to all possible actions. For people in the most severe censorship environments, it's important to have as many options to connect as possible.

In some iterations, we tried to indicate which option might be the best choice—by indicating which is easiest, which creates the least amount of friction, and which

may be the most resilient to blocking. Ultimately, the answer is so context specific that we ended up adding the option to 'Ask Tor' in the bridge configuration view. When users 'Ask Tor', a request is sent to the circumvention API. The recommendation, which is based on the country the user is in, is sent back.

Three: Accommodate the Behavior to Use As Needed



From training sessions, we've learned that some people will activate a VPN on certain occasions, like when on public wifi or when traveling. They won't run it all of the time or when they don't need it. Also, VPNs don't work well with some apps. Running your banking app through a VPN, for example, may cause issues. WhatsApp calls will not work while Orbot is running. This is another [case](#) where users need to stop the VPN.

We want to provide flexibility in use. For the user experience this means, giving people the option to configure the VPN with select apps only, and making it easy to [turn on and off](#).

Language Localization

From the in-person workshops and also from the feedback we got from Mexico we realized that in the country using gender-inclusive language is a priority among the population, for that reason, we added a locale-specific translation for Mexico using the most common form of inclusive language suggested by partner organizations in the region.

Plans Moving Forward

There are several things we've learned that will inform our roadmap as we move forward. Those include:

- ***In App Educational Tips*** Some participants said that the app needs user guides and prompts to show users what each feature is for. There's also an opportunity to give users more guidance around which apps to configure Orbot with.
- ***Protection during checkpoints*** Checkpoints by drug cartels in the South of Mexico have increased. While it's not yet clear what they are looking for, we'll consider a camouflage feature for Orbot.
- ***Optimize for high latency, low bandwidth environments*** It's very common for networks to be slow in parts of Latin America, namely in rural areas. We need to ensure our design and development process considers this, and find better ways to simulate and test.

The most meaningful intervention and learning outcomes of this work were tied to communication. The reason people are not adopting Tor tools is not that they do not work in their context, they are not adopting them because:

1. They either do not know they exist
2. They have a hard time understanding what they do and how they work
3. They know of their existence but they have many misconceptions about them.

We identified many misconceptions about the Tor network among our target users. Not only were we able to address them on the spot, but we will also be able to share those in future workshops and perhaps our websites and blog posts to help the broader community.

By running all the workshops among different communities, in different regions, and with participants from very different backgrounds, we now know that Tor tools could mitigate many issues affecting these groups of people. What's been missing is:

1. Localized user guides, FAQs, and other support materials
2. Communication by local trainers to keep the population updated
3. Feedback loops to report issues back to the technology teams

Conclusion

In Latin America the majority of the population does not have their own computer, and instead rely on their smartphones as their primary device. This makes the availability of Tor-based solutions for smartphones a necessity for the communities of activists, journalists, and human rights defenders we aim to support. These personal devices play a main role in their everyday lives and safety protocols, making them a critical vector for attack that needs to be protected. These users also face challenges beyond the screen that include physical inspection and attacks, and infrastructure and economic challenges related to reliable and affordable access to mobile data.

These combination of factors ultimately are not unique to Latin America. We can find similar circumstances faced by people who would benefit from using Tor on smartphones in other parts of the world, such as in the Middle East and Africa. In some cases, the physical threats are not from extra-governmental groups like cartels, but instead by local militias or “morality” police. In other cases, the lack of access to data isn’t just driven by cost, but also due to government shutdowns. From these common unfortunate circumstances, we can derive a useful set of features that make Tor on smartphones more viable and valuable, while also less risky and more reliable, for all people around the world.

Thank you to everyone who made this work possible, from our partners at Tor Project, our community partners, funders, designers, developers, and other supporters. Without all of you, we would not be able to do this important work to broaden the reach and effectiveness of privacy-enhancing tools in Latin America.



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