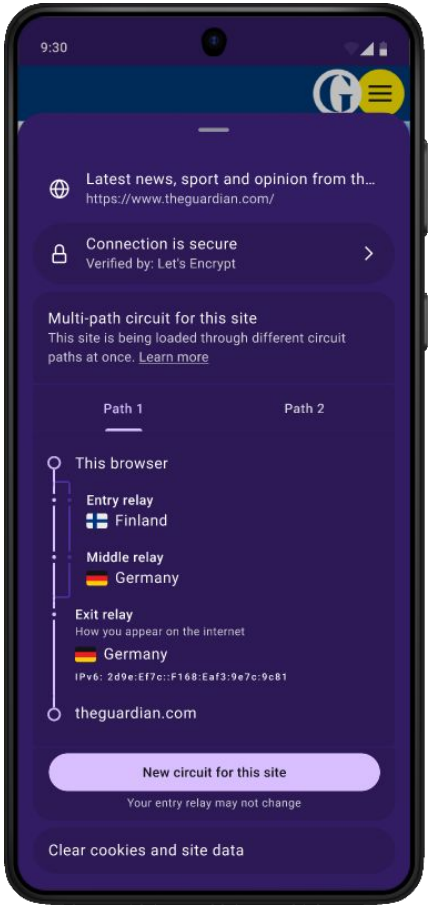
User Research Report

Usability tests of Conflux display in Tor Browser



Project 163

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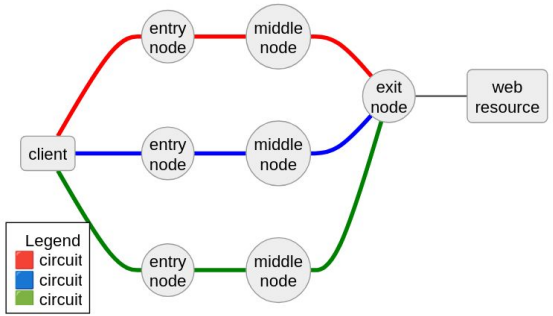
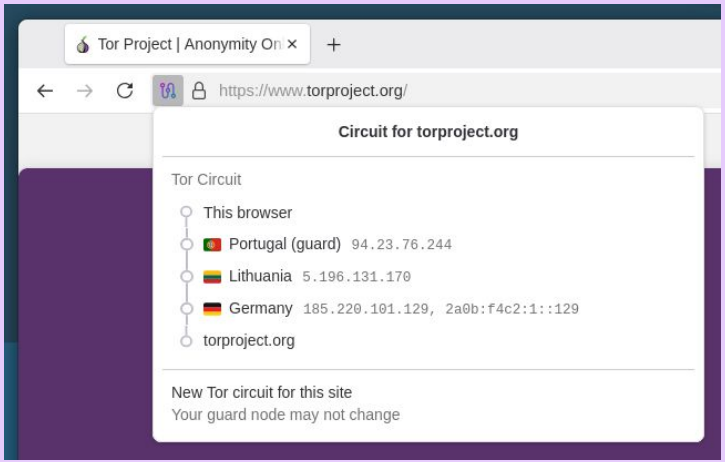
Conflux

Conflux is a new feature that enhances speed and reliability. Conflux splits a Tor circuit across multiple paths that are used in parallel and prioritizes the paths with lower latency.

We want to adapt the current circuit display in Tor Browser to displaying Conflux circuits, as a start with 2 paths, but maybe more in the future.



Current circuit display



Methodology

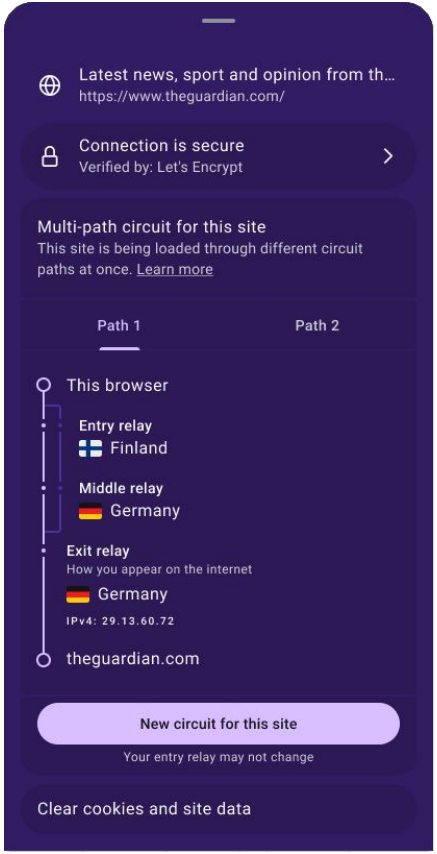
What we tested

4 Figma prototypes, 2 alternate designs on 2 platforms:

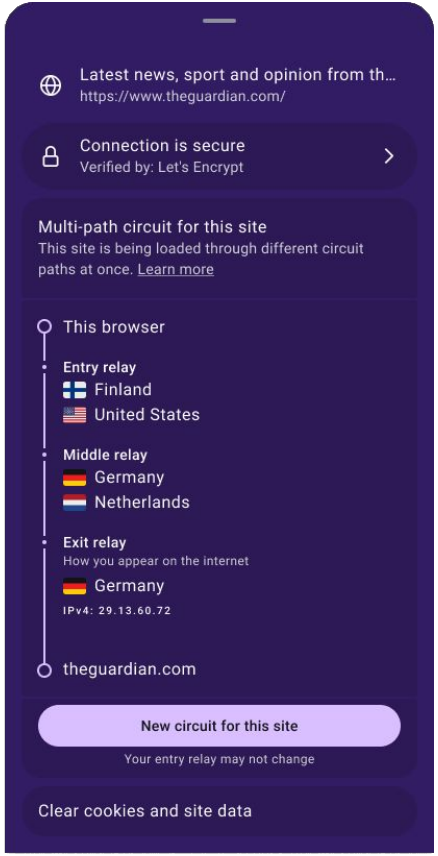
- Tor Browser Desktop
  - Tab design
  - List design
- Tor Browser Android
  - Tab design
  - List design

2 PNG images for the heading, with 2 alternates each:

- Title design vs. Pill design



Tab design



List design

Methodology

Participants

We recruited participants through 3 mailing lists: Tor Global South, OONI Partners, and AccessNow KeepItOn.

As a consequence, all participants were both users themselves and proxies to our target audience: digital security trainers or members of digital rights NGOs.

We selected 8 participants in SIDA countries with diverse demographics, giving priority to less technical people.

Diversity in the demographics

- 6 countries
- 5 people in Africa, 2 in Asia, 1 in America
- 4 women, 3 men, 1 non-binary
- 8 desktop users, 5 Android users
- 5 frequent users, 3 occasional users

	P1	P2	P3	P4	P5	P6	P7	P8
Gender	Man	Man	Woman	Woman	Woman	Woman	Woman	Non-binary
Country	Zambia	Nigeria	Pakistan	Kenya	Pakistan	Bolivia	Uganda	Uganda
English	Spoken	Spoken	Spoken	Spoken	Spoken	Read	Spoken	Spoken
Frequency of Tor use	Many times	Many times	Few times	Few times	Many times	Few times	Many times	Many times
Tor Browser desktop	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Tor Browser Android	Yes	Yes	No	Yes	No	Yes	No	Yes

Methodology

Testing setup

We conducted the tests remotely through Signal calls.

To cover the 4 designs, we used a mix of *between-subject* and *within-subject* study:

- 4 participants tested the desktop version
  - 2 of them tested the Tab design first
  - 2 of them tested the List design first
- 4 participants tested the Android version
  - 2 of them tested the Tab design first
  - 2 of them tested the List design first
- After testing their 1st design, participants were asked to comment on the 2nd design without testing it as thoroughly.

Formative testing

For this early stage of design, we designed a methodology of *formative testing* to understand which aspects of the design work well or not, and why.

Participants could not use the prototype realistically, so the facilitator asked participants where they would click or tap and operated the prototype for them. This triggered deeper conversations about people's understanding of the design.

Methodology

Tasks

We gave the participants several tasks to discover the circuit display and ask them semi-structured interview questions to test their understanding of the designs.

For example:

- *From which country does the website think that you are connecting from?*
- *Give me a list of all the countries through which your connection goes.*
- *Can you explain the differences between these 2 designs?*

Full testing and interview script

Results

This summary of the results is structured as answers to the *research questions* that were established between designers and researchers before the tests.

Results

Do users know where to find the circuit display?

No, people need help to find the circuit display.

- 6/8 participants didn't find it on their first 2 tries.
- 5/8 participants went to the hamburger menu on their first try.
- 3/8 participants didn't think that they could click on the Unified Trust Panel (UTP).
- 2/8 participants mentioned that they associate the UTP with site security and not with the Tor connection.

The design of the circuit icon didn't seem to help people understand what this button provides.

Quotes

> I think this icon shows whether the website is safe or not.
>
> P8

> I thought it was part of the search. I don’t know it.
>
> P7

Results

Is it intuitive for users to switch between the view of each path in the Tab design?

Yes, people understood the tab design as something they can use to switch views.

Results

Do users understand that websites using multi-path circuits are using the different paths at the same time?

No, people need to see the 5 relays and their parallel relationship to understand that Conflux uses 5 different relays in 2 parallel paths.

- With the Tab design, 3/4 participants thought that they could choose which path to use.
- With the List design, 3/4 participants thought that the 5 relays were used one after the other.
- 5/8 participants found the List design clearer to explain that both paths are used at the same time.
- 1/8 participant admitted that neither design is clear.

Quote

> From [Tab design], I think that you can choose either one, not use two at the same time. Maybe you choose Path 1 and you don't like it, then you choose Path 2 as another option.

P2

Results

Do users understand that the same exit relay is used in multi-path circuits?

With the tab design: no, because they thought that they could choose which path to use.

With the list design: yes.

Results

Do users wonder about the implications of Tor Browser using a single-path vs. a multi-path circuit?

Yes. We need to explain the benefit of multi-path circuits, otherwise people will make wrong interpretations and take wrong decisions.

- 5/8 participants thought that multi-path is more secure because it has more relays.
- 4/8 participants thought that multi-path is slower because it has more relays.

Quote

> If there are 2 entry countries it will be more secure, but it will slower because it will go through more places.

P6

Results

Do users wonder about how to change between single-path and multi-path?

Yes.

- 4/8 participants thought that they could change between single-path and multi-path by selecting the New Circuit button.
- 3/8 participants didn't understand when Tor Browser uses single-path or multi-path.

Quotes

> “New Circuit for this site” is vague and I don’t know what’s gonna happen.
>
> P3

> It uses more countries if the site is more restricted, to really mask your connection.
>
> P7

Results

Do users understand the relay terminology?

It’s a bit hard to tell…

It seems like most participants understood that the 3 relays are 3 hops to the destination server. Others were much more confused:

- Some participants talked instead about "points", "servers", “levels", "hop", "steps", and so on.
- 3/8 participants understood that the website saw them connecting from the entry relay.
- 2/8 participants understood that the entry and exit relays correspond to entering and exiting the website (not the Tor network).

In general, it seems like "circuit" and "path" doesn't make the relationship between circuit and path clear enough.

Quote

> “
>
> It shows that I’m connecting from 3 different places.
>
> The site sees that I’m connecting from the entry relay. [...] The middle relay is so hard for me to explain... [...] The exit relay shows where I’m exiting the site from.

P4

Results

What questions do people have when going to “Learn more”? (not written yet)

- 3/8 participants want to learn when to use single-path and multi-path depending on the situation.
- 3/8 participants want an explanation and comparison between single-path and multi-path.
- 3/8 participants want an explanation about how Tor and the Tor Browser work.

Quote

> **A comparison between single-path and double-path circuit. Whether I’m comfortable using single-path or double-path depending on my situation.**

P1

Results

Do the other elements of the UTP interfere with the circuit display?

No.

Detailed findings

Companion documents with more detailed findings:

- Spreadsheet with a list of over 70 observations with frequency and timestamp of their occurrence

  https://nc.torproject.net/s/swH427JQiKX5sGH

- Video clips illustrating the most important issues (requires a Nextcloud account)

  https://nc.torproject.net/f/833683

- GitLab issue with all documents

  https://gitlab.torproject.org/tpo/ux/research/-/issues/168