Final OONI Report for MOSS
30th April 2019

Thanks to Mozilla Open Source Support (MOSS), the Open Observatory of Network Interference (OONI) project has successfully revamped OONI Explorer: an open data resource on internet censorship worldwide.

This final report documents the activities that OONI carried out over the last months in completion of its contract with MOSS and towards the beta release of the revamped OONI Explorer.

A beta of OONI Explorer can be accessed at: https://explorer-beta.ooni.io/

Implemented country profile pages
The new OONI Explorer country profile pages share rich information on internet censorship and other forms of network interference for more than 200 countries around the world.

Automatically updated with new OONI measurements, the OONI Explorer country profile pages provide timely information on the following for each country:

- **Website blocking**: (1) Whether the testing of specific websites presented network anomalies, (2) Which websites are confirmed blocked, (3) How the blocking of websites differs across ISPs.
- **IM app blocking**: (1) Whether and how instant messaging apps (WhatsApp, Facebook Messenger, Telegram) are blocked, (2) How the blocking of instant messaging apps differs across ISPs.
- **Circumvention tool blocking**: Whether access to the Tor network is blocked and how that differs across ISPs. *(We have plans to integrate OONI measurement data for other circumvention tools as well - such as Psiphon - once the relevant OONI Probe tests have been shipped as part of the OONI Probe mobile app.)*
- **Middleboxes**: Whether middleboxes have been detected on tested networks and whether those middleboxes are fingerprintable.
- **Network speed and performance**: The median upload and download throughput per network.
The above information is summarized at the start of OONI Explorer country pages, providing users with an overview of OONI key findings.

Before diving into more detailed information, users are presented with a graph that shows the measurement coverage per test class, i.e. the volume of measurements collected from each OONI Probe test class (e.g. websites, performance, instant messaging, etc.) over time within that specific country. This information is essential for determining the confidence with which findings can be assessed, as larger volumes of measurements generally allow for more comprehensive and potentially more accurate data analysis, and longitudinal datasets enable the identification of trends and patterns. This is especially true when looking at the blocking of websites and apps.

The new OONI Explorer, therefore, displays information through graphs which show a timeline on the blocking of websites and apps. In fact, a graph providing such a timeline is available for every single blocked website and app. This enables users to easily identify when the blocking started (assuming that there is stable and sufficient measurement coverage), to track the blocking over time, and to potentially identify the unblocking of the site/app. Researchers can then correlate this data with other information that could help explain why the blocking started (and stopped) when it did (i.e. whether that can be correlated with any particular event).

To compare findings across networks, the new OONI Explorer country pages display graphs that show OONI measurement data (in timelines) collected from multiple different ASNs. This not only enables users to track the blocking of sites and apps over time, but to also examine how that differs across ISPs in a country. Network speed and performance data is summarized and also presented across ASNs, enabling OONI Explorer users to not only identify which network has the best (average) speed and performance, but to also compare and track metrics over time.

Following the major revamp of the OONI Explorer country pages, they now not only host large volumes of network measurements, but they also display information through graphs that can more easily be used by human rights communities as part of their advocacy efforts. The new OONI Explorer country pages provide timely updates on internet censorship, based on empirical data, showing how censorship changes over time and across networks.

We are excited to see how the internet freedom community will make use of the new OONI Explorer (and to provide support along the way)!
The main page of the new OONI Explorer displays **censorship highlights from around the world, identified and confirmed through OONI data**. These highlights involve censorship events that occurred during political events (such as elections and protests), the blocking of media websites and LGBTQI sites, as well as censorship changes (that have been tracked through OONI data over time) - such as the unblocking of sites and the change of censorship techniques by ISPs.

The OONI Explorer censorship highlights page not only links to the relevant (OONI Explorer) Search pages (through which users can find the raw network measurement data pertaining to the highlights), but also links to OONI’s published research reports that share context and provide an interpretation of the data. This page will continue to be updated on an ongoing basis.

Overall, OONI Explorer hosts millions of measurements collected from more than 200 countries since 2012. Every day, OONI Explorer is dynamically updated with new OONI measurements collected from around the world. The landing page of the new OONI Explorer
is automatically updated to display the expanding volume of measurements collected from around the world, as well as the increasing coverage of networks and countries.

While users can gain an overview of some of the top global censorship highlights via the OONI Explorer landing page, each OONI Explorer country page offers a wealth of data and highlights, which are presented through graphs and other visualizations.

OONI Explorer now has a powerful search tool which not only enables its users to filter large volumes of measurements quickly, but which also enables them to compare measurements and generate visualizations based on the questions that interest them. This can support the internet freedom community in monitoring and responding to censorship events around the world.

**Integration layer between OONI Explorer and the OONI API**

The [OONI API](https://ooni.org/api) is an HTTP interface to access OONI network measurement data and metrics related to measurements. The OONI API allows anybody to access the growing volume of OONI network measurements.

When developing the new OONI Explorer, we focused on ensuring that the same public OONI API is used to back the visualisations and search pages. As part of this task, we worked on improving our data processing pipeline and added new API endpoints to OONI API to support the various features of the new OONI Explorer.

Our work on this can be viewed via the following GitHub issues and pull requests:

- [https://github.com/ooni/pipeline/pull/124](https://github.com/ooni/pipeline/pull/124)
- [https://github.com/ooni/pipeline/pull/128](https://github.com/ooni/pipeline/pull/128)
- [https://github.com/ooni/pipeline/pull/144](https://github.com/ooni/pipeline/pull/144)
- [https://github.com/ooni/pipeline/pull/151](https://github.com/ooni/pipeline/pull/151)
- [https://github.com/ooni/api/pull/77](https://github.com/ooni/api/pull/77)
- [https://github.com/ooni/api/pull/60](https://github.com/ooni/api/pull/60)
- [https://github.com/ooni/api/pull/69](https://github.com/ooni/api/pull/69)
- [https://github.com/ooni/api/issues/61](https://github.com/ooni/api/issues/61)
- [https://github.com/ooni/api/issues/59](https://github.com/ooni/api/issues/59)

We also worked on capturing exceptions and investigating performance issues with OONI API more streamlined as part of the following pull requests and issues:

- [https://github.com/ooni/api/issues/62](https://github.com/ooni/api/issues/62)
- [https://github.com/ooni/api/pull/66](https://github.com/ooni/api/pull/66)
Integration with OONI Probe mobile and desktop apps

OONI Explorer consists of measurements collected by users of the OONI Probe (mobile and desktop) apps. Every time an OONI Probe user runs a test, their measurements are automatically sent to OONI servers, processed, and published on OONI Explorer (unless if they opt-out). OONI Probe users therefore contribute to a growing archive on network interference.

To integrate OONI Explorer with the OONI Probe apps we have ensured that the measurement pages, which are going to be the most frequently accessed pages via the mobile app, are responsive and work well in small screen resolutions. This will make the transition from the OONI Probe mobile apps into OONI Explorer much smoother.
Although we haven’t yet implemented this feature inside of OONI Probe mobile, as this feature is dependent on having permalinks associated to measurements and making the pipeline tick faster (see: https://github.com/ooni/pipeline/issues/48 & https://github.com/ooni/probe/issues/816 & https://github.com/ooni/api/issues/72), we believe that all the OONI Explorer work relevant to this is going to make the user experience of this feature work well once it’s implemented in Probe.

Conclusion

The OONI team thanks Mozilla for supporting the revamp of OONI Explorer. We are very excited about the new OONI Explorer, as we believe that it will significantly support human rights efforts around the world.

The new OONI Explorer shares timely open data on censorship events around the world through charts and other visualizations. Its powerful new search tool enables researchers to dig through large volumes of measurements quickly and easily, explore questions that interest them based on openly available measurements, and to generate the charts of their choice.

Human rights advocates can easily find which websites and social media apps are blocked around the world, and use OONI data as part of their campaigns. Circumvention tool projects can inform the development and deployment of their technologies based on OONI data, showing where and how their tools are blocked.

Prior to MOSS, OONI Explorer was likely the largest publicly available dataset on internet censorship to date. Now, thanks to MOSS, OONI Explorer is significantly more actionable.

We have released a beta version of OONI Explorer and plan to launch the stable version in June 2019.