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Annual Development Review of the Whistle platform prototype

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### Abstract

This report gives an overview of how the design and development of the Whistle has evolved in year two of the project. The first annual review was augmented in Month 18 of the project ahead of the interim review meeting to bring it up to date, therefore this report focuses on the period from July 2017 - December 2017. This period was dominated by preparation for the launch of the GRN campaign, refinements to design and a focus on moving to a production-ready state.

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## 1 History

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## 5 Introduction

This report gives an overview of how the design and development of the Whistle has evolved in year two of the project. The first annual review was augmented in Month 18 of the project ahead of the interim review meeting to bring it up to date, therefore this report focuses on the period from July 2017 - December 2017.

Work in this period has focused on preparing for the launch of the first reporting campaign in partnership with Global Rights Nigeria (GRN). The reporting front-end and the NGO Dashboard have both been heavily revised since the interim review, these have been iterated in response to feedback from GRN and Redgate, while on the back-end the Whistle has gone from a prototype to a usable product, thoroughly tested and ready for deployment.

### 5.1 Background

Following the initial academic/research phase, development work on The Whistle platform commenced in April 2017.

Initial work comprised consideration of functional requirements, and a technology survey to determine available tools and platforms which could be capitalised on.

It was concluded that there were no extant reporting systems which would fulfil the requirements of The Whistle project, and that a bespoke system would be developed which would be tailored to collecting and managing incident report submissions, working closely with alpha partners to determine their requirements. This system would then form the foundation for subsequent digital verification developments.

Options for incident report submission by SMS were evaluated, but finally use of a web interface for report submissions was prioritised, in line with the needs of the first NGO partner's campaign.

A prototype web-based report submission system and report management system was developed and presented at the ChainReact programme review in Volos in mid-July 2017.

## 6 Whistle Development Progress since M19

### 6.1 Development of initial platform

In early August a co-development partner week was organised with Redgate Software in Cambridge. Redgate is a primarily Microsoft SQL Server-based software house. They have an annual 'down-tools' week, where they turn to preferred internal projects (as opposed to client-facing work), and also nominate a non-profit organisation to partner with, which this year was The Whistle. The Redgate partner week included - user-interface / UX review - review of functionality on out-of-date platforms (web and phone) - image meta-data analysis to support digital verification (e.g. location, date, etc) - reverse image lookup for verification

of supporting images supplied as part of incident report submissions - obtaining weather conditions for given locations/dates, to support digital verification in conjunction with image metadata - branding and visual styling standard to bring greater professionalism to the platform.

Development effort then turned to the development of a production-quality system to bring to alpha partners.

This work included applying new visual standards, revising extensive prototyping-standard code to bring it up to production standard, reviewing database storage schemas, writing unit and integration test suites and implementing continuous integration test procedures, implementing access logging and error logging, using AWS S3 for uploaded images files & documents, recording browser 'user agent' for profiling required technology support.

Considerable work went into reviewing and revising the ergonomics of the parts of the system which will be used for managing incoming incident reports, in conjunction with our first alpha partner, Global Rights Nigeria and with consideration of their current workflow (which is essentially paper-based). Further consideration and revisions went into the use of anonymous identifiers.

Work also went into managing user accounts within the system, including a hierarchy of privileges, and secure password reset functions.

A feature was added for showing local supporting resources following an incident report submission. This feature takes a location (address), geolocates it using Google Maps API, then orders a list of available resources by their distance from the location. The purpose of this feature is to offer a reporter some useful information (where they can access various types of help), so that the exchange is not so one-sided (with the reporter providing a report to GRN and receiving nothing in return).

## 6.2 Redgate developments

For the Redgate 'down-tools' week, Redgate Software made a dozen or more of their engineers and marketing staff available to The Whistle, as their contribution to a non-profit organisation.

Four teams worked on the following areas.

User interface & user experience evaluation and improvements: This team focused on the user interface for the first reporting campaign, which was perceived as being much too complex and overwhelming. A new interface was designed on paper and later mocked up (Figure 2). A style guide for the Whistle was also formalised following the week at RedGate (Figure 1).

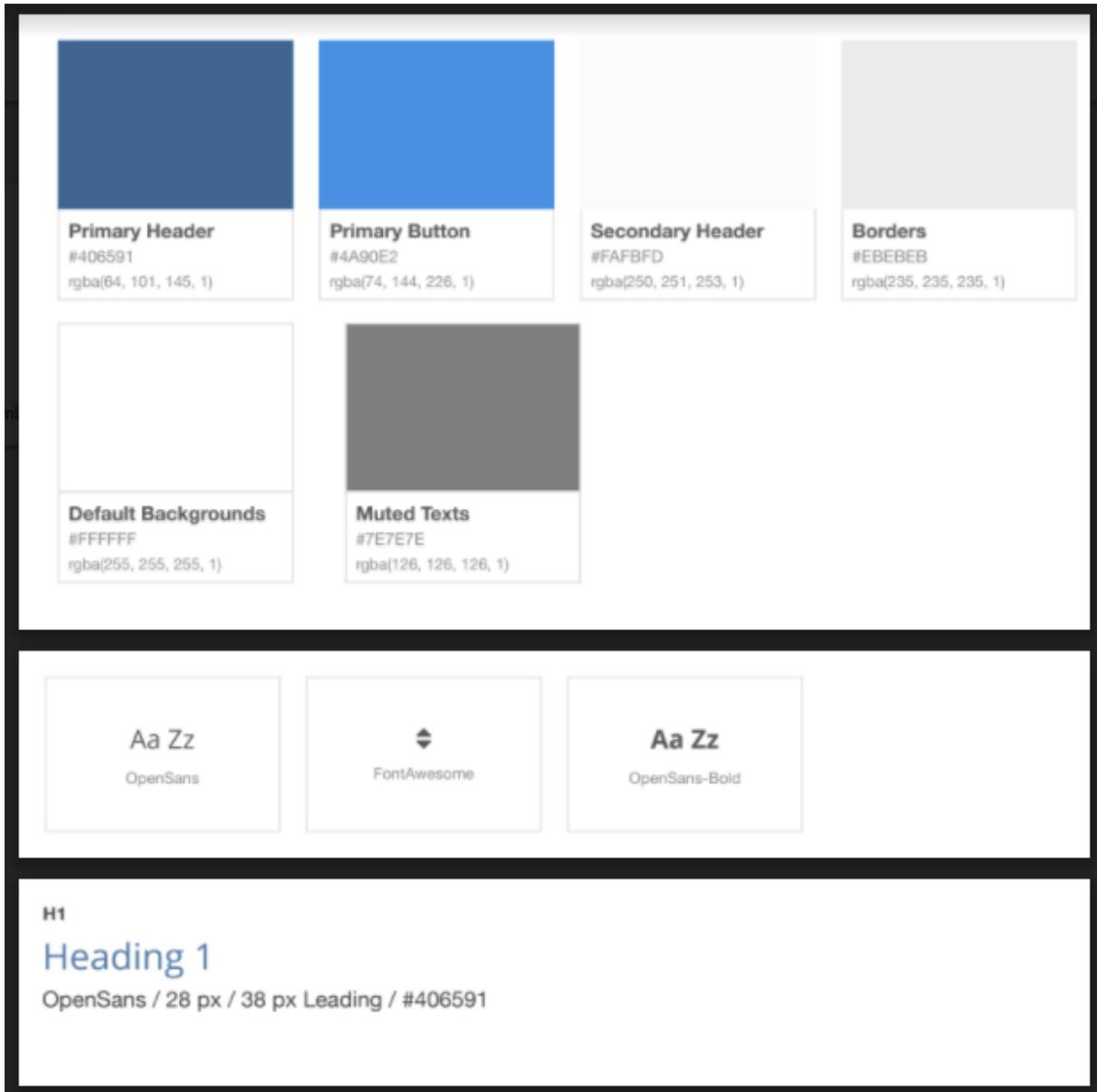
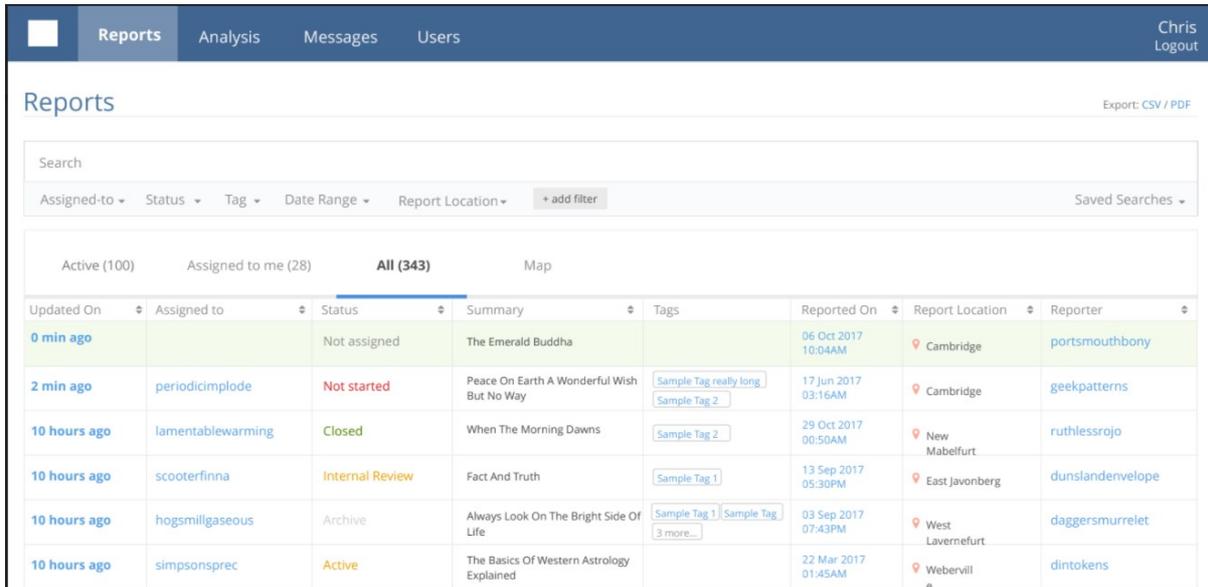


Figure 1 Colour and Font guide adopted following RedGate week



| Updated On   | Assigned to       | Status          | Summary                                    | Tags                                    | Reported On         | Report Location  | Reporter         |
|--------------|-------------------|-----------------|--|---|---------------------|------------------|------------------|
| 0 min ago    |                   | Not assigned    | The Emerald Buddha                         |   | 06 Oct 2017 10:04AM | Cambridge        | portsmouthbony   |
| 2 min ago    | periodicimplode   | Not started     | Peace On Earth A Wonderful Wish But No Way | Sample Tag really long<br>Sample Tag 2  | 17 Jun 2017 03:16AM | Cambridge        | geekpatterns     |
| 10 hours ago | lamentablewarming | Closed          | When The Morning Dawns                     | Sample Tag 2                            | 29 Oct 2017 00:50AM | New Mabelfurt    | ruthlessrojo     |
| 10 hours ago | scooterfinna      | Internal Review | Fact And Truth                             | Sample Tag 1                            | 13 Sep 2017 05:30PM | East Javonberg   | dunslandenvelope |
| 10 hours ago | hogsmillgaseous   | Archive         | Always Look On The Bright Side Of Life     | Sample Tag 1<br>Sample Tag<br>3 more... | 03 Sep 2017 07:43PM | West Lavernefurt | daggersmurrelet  |
| 10 hours ago | simpsonsprec      | Active          | The Basics Of Western Astrology Explained  |   | 22 Mar 2017 01:45AM | Webervill e      | dintokens        |

Figure 2 Report List view design following RedGate week

App compatibility on older platforms: given that the initial alpha partner for The Whistle is in Nigeria, compatibility on older devices is important, especially for the reporting app which will be used by members of the general public. Tests were made on a variety of physical devices and emulators, as a result of which various recommendations on coding practice were developed. It was highlighted that UC Browser is widely used in Africa, though relatively unknown in the UK.

Image metadata and reverse image search: tools were investigated for extracting EXIF metadata from images uploaded as part of the incident report submission, and means of performing reverse image search were researched, to check if an uploaded image had actually been previously posted on the internet. EXIF metadata (while not infallible) may be used to verify the date and/or location the image was taken; also, this data can be used to look up weather conditions for the date & location, confirm veracity of reports. Reverse image lookup was found to be feasible, but highlighted privacy issues.

Branding guidelines: not relevant for the current report.

### 6.3 Development to production

The initial prototype focused on exploring functionality, with minimal consideration of visual presentation. Following the lead from the Redgate branding exercise, the team firstly applied the branding guidelines to the dashboard app and reporting app, and then went on to evaluate and refine the visual presentation. This included such elements as making radio-button options in the reporting app larger than the browser defaults.

The initial prototype was developed with a focus on rapid implementation of functionality, so code was reviewed with consideration to long-term maintainability. Some code was reorganised into better structures, code was more fully commented, etc.

The initial prototype was developed with a small test suite (based on the *mocha* testing framework and *chai* assertion library) which demonstrated the planned approach to a full set of continuous integration tests. That restricted set of tests has been expanded to over 300 tests which exercise almost all the functionality of the system (the main exceptions being rare error conditions which are not worth testing for). This test suite gives considerable assurance that continued development and future enhancements will not introduce regression bugs which interfere with existing functionality. The test suite is divided into unit tests, which invoke component functions and classes directly, and integration tests, which test the complete application by invoking HTTP requests (using the *supertest* HTTP assertion library).

A development workflow was designed and implemented, whereby pushing updates to the GitHub repository automatically runs the test suite as part of a continuous integration build pipeline, and once CI tests passed, a new staging app is automatically built on Heroku, which then gets manually promoted to production.

As functionality was enhanced and refined, the database schema went through several revision cycles, in order to ensure the data was logically arranged and served requirements of data manipulation, querying, etc. In particular, geolocation indexes were rearranged as thinking evolved about how geocoding of incident locations should be approached. Also, the storage of uploaded images and documents was refined, and other similar changes implemented.

Bespoke logging functions were implemented, tailored to the requirements of The Whistle. Records are held in the database (in MongoDB capped collections) which facilitate filtering and other data manipulation better than classic file-based logs (for example, filtering by organisation, by username, within given date ranges, etc). Access logs are similar to Apache logs, but also record organisation & username, user agent & platform, response time, etc. Errors are logged separately, including 404 (Not Found) errors. Status 500 (Internal Server Error) generally indicate coding errors, so stack traces are also recorded.

While not a high priority for Global Rights Nigeria, a feature for uploading supporting images and documents as part of an incident report submission is likely to be important moving forward, so was also implemented at this stage. As Heroku is an ephemeral 'platform-as-a-service' (PAAS), elements requiring persistent storage are held on AWS S3. This is set up to be accessible via the app as a proxy server, so uploaded files are only accessible through the app.

For Global Rights Nigeria in particular, and also probably in the case of future NGO partners, a knowledge of the browsers and platforms in use is very important, so that functionality can be ensured on the most commonly used platforms. In addition to the access logging (which is

ephemeral), user agent and platform information is stored permanently with each submitted report.

#### 6.4 Design and Development process

The Whistle puts serving the needs of NGO partners' use-cases at the forefront of development. The interactions between the research team and the partner NGO serve as both the foundation for establishing requirements and as the most important source of feedback on the product's utility.

This research falls under both WP2 and WP4, moving more towards WP4 (preparing for the launch of reporting campaigns) as the prototype gets closer to release. The first NGO partner is Global Rights Nigeria (GRN), and communications have tended to occur over Skype and email, between GRN's leadership and the research team of the Whistle. Starting with interviews to establish the practices of GRN and understand the use case of the Rape is a Crime campaign, the materials used for generating reports by GRN currently were shared and reviewed and early mock-ups of the Whistle produced. The Whistle's design was amended in accord with GRN's feedback, and as functional prototypes were prepared the development team joined some calls to talk through the Whistle's current state and receive feedback. Contact with GRN primarily happens through the research team however, with feedback being distilled into updated requirements for the development team. Three members of the Whistle's research team will visit GRN in Nigeria for the launch of the campaign, to participate in training of GRN staff/volunteers and observe their use of the platform.

Internally, the Whistle team relies on a combination of in-person meetings and coordination tools. The product team meets in person each week to discuss progress and plan the following week's work, in person meetings are also regularly called to work on the design and testing of specific features, and for pair coding/design work.

Slack was adopted as the primary means of asynchronous communication, replacing email. Asana was adopted to structure and track development work more formally, and an Asana feed integrated within Slack. Google sheets are also used to catalogue material that is more focused and short-term in nature – for example a round of bugs or feature improvements produced as part of a testing session.

Several members of the Whistle's research team have a background that involves software development in some way, and this has allowed the team to take on the roles of product management and “business development” or “account management”. The research team engages with the NGO partner to define requirements and then works with the development team to turn these requirements into well-defined features. The research team also serve as testers of the product, reviewing it internally before a new version is presented to the NGO partner, then relaying feedback once this has been considered in detail.

## 7 Current state of the Whistle

The Whistle's first reporting campaign is ready to launch in mid-February, and it is worthwhile to review the current state of the product. To recap, this iteration of the Whistle has two major components: report generation and a dashboard for working with incoming reports.

### 7.1 Reporting interface

For GRN's Rape is a Crime campaign, the initial areas being targeted are University campuses. Access to the internet is ubiquitous in this context and the majority of potential reporters are believed to have smartphones. The method of creating reports for designed for this campaign is therefore a web form that has been tailored to deliver a good user experience when access from a smartphone. Particular attention has been given to ensuring that the reporting form works well on a variety of browsers and mobile operating systems, specifically those associated with older models of smartphone.

#### Global Rights Nigeria Incident Report

##### Before you start...

This is a safe and anonymous way to report something that has happened to you or someone you know. This is not for ongoing emergencies.

- You are free to tell us as little or as much as you are comfortable with.
- Your report will only be seen by staff and volunteers of Global Rights Nigeria assessing the report.
- We only want to know what happened, not your identity.
- This should take less than 10 minutes.

[Get started](#)

##### Other ways to talk to us

Call us on **814-917-1224**

Visit us at **19, YPO Shodehinde Street, Utako, Abuja**

Figure 3 Introduction screen for the Rape is a Crime campaign

Considerable thought has been put into the framing of a report, this is positioned as an anonymous activity with reports only being seen by GRN, and a fairly quick process, taking less than 10 minutes. Potential reporters are offered alternative means of contacting GRN, if they wish to have a more immediate and involved interaction about the incident.

## Global Rights Nigeria Incident Report

1 2 3 4 5 6 7 8

Have you used this anonymous reporting service before?

Yes

Enter your anonymous alias

No

We make sure that your report is anonymous by creating a random identification alias.

If you want to follow up, use the anonymous alias below so we can access any relevant information.

This report will use **vetch fjord**

[Generate another random alias](#)

Submit and continue

Skip

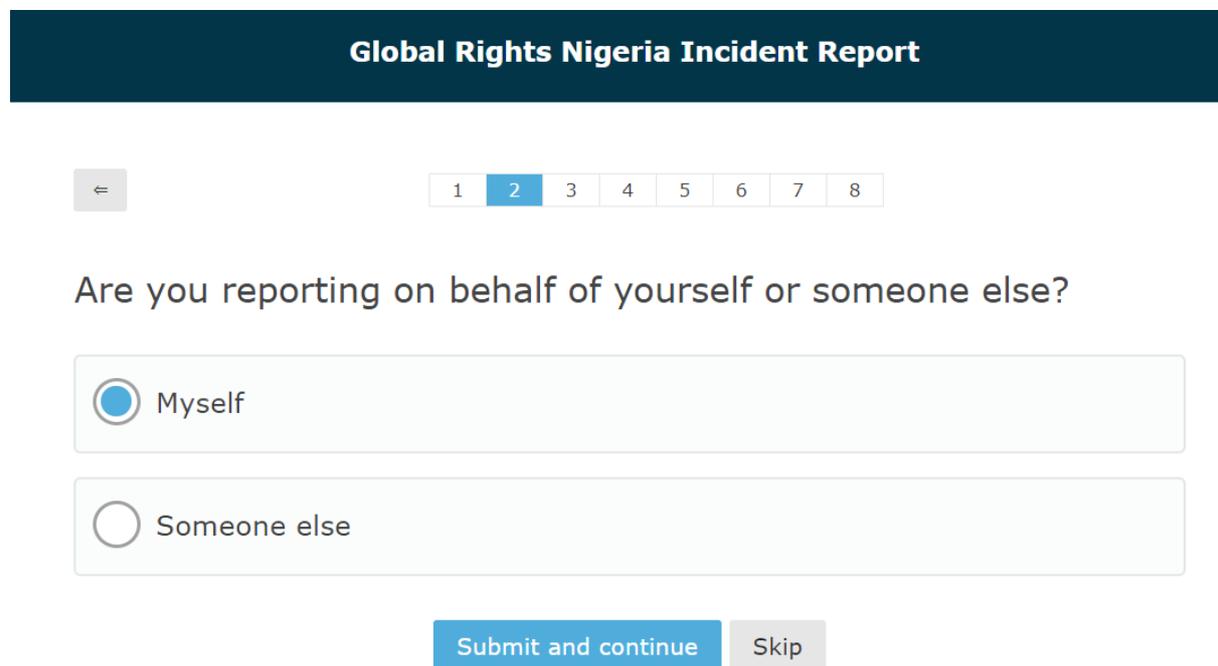
Figure 4 The first page of the GRN reporting form

While the anonymity of reporters is important to maintain, there are scenarios where this can limit the use of the data. If an individual submits multiple reports relating either to themselves or others it would be useful for GRN to understand this. Also, where a reporter makes a report using the form initially they may subsequently decide to reach out to GRN or an affiliated organisation for support. In this scenario, it would be beneficial for the reporter to be able to identify their report(s), so that they do not need to repeat details of an incident which may be traumatic for them to recount.

The compromise arrived at is to generate an alias for reporters, each reporter can make a note of this and if they have subsequent interactions with the campaign can use it to link their reports. The package used to generate these aliases initially proved problematic because some of the word combinations were suggestive/inappropriate, and so a customised version has been produced that uses landmark-related words.

Each page of the report includes an indicator bar at the top to show the reporter how far they have progressed in the process. Reporters can use the back/forward buttons to navigate within the report without losing the information they have entered.

Based on discussions with GRN, every aspect of the reporting form is optional, and reporters are free to skip any questions they would prefer not to answer. Reports are submitted to the database in an incomplete fashion as soon as they are created and flagged as “incomplete”, as each page is completed more data is added until the report is finally completed and marked as such. This was again a decision taken by GRN, who saw value in having access to partially completed reports. These may be informative in understanding how reporters interact with the system and any aspects which discourage reporters from continuing with the process.



The screenshot shows a dark blue header with the text "Global Rights Nigeria Incident Report". Below the header is a progress indicator bar with a back arrow on the left and a row of eight numbered boxes (1-8). Box 2 is highlighted in blue. Below the progress bar is the question "Are you reporting on behalf of yourself or someone else?". There are two radio button options: "Myself" (selected) and "Someone else". At the bottom of the form are two buttons: "Submit and continue" (blue) and "Skip" (grey).

Figure 5 Page 2 of the reporting form

Reporters can indicate whether the report concerns an incident where they were the victim, or report on behalf of someone else. Text of subsequent questions is altered based on this response. Radio button size has been increased and the full box has been made click-able to improve user experience on a smartphone.

## Global Rights Nigeria Incident Report

< 1 2 3 4 5 6 7 8

To start, do you remember when this happened or when it began?

We understand this can be difficult. Please take your time and tell us as much as you are able.

Yes, exactly when it happened  
Please select the date and approximate time

DD    MMM    YYYY

▼    Fe ▼    201 ▼

at ▼

Yes, about when it happened  
For example, last month, a couple of years ago, ...

▼

I do not remember

Is it still happening?

Yes

No

[Submit and continue](#) [Skip](#)

Figure 6 Page 3 of the reporting form.

This page and others incorporates messaging designed to make the reporter feel more comfortable, recounting details of these incidents can itself be traumatic and great care has been taken to give the process an understanding feel. The date/time selection method saw a number of iterations, with this one chosen because it is the most compatible option, it works on any phone or browser.

## Global Rights Nigeria Incident Report

 ←

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

Where did this happen?

Location

Please provide as much detail as you are able – this could be an address, restaurant name, or neighborhood or sights and landmarks you recall.

I don't know

Submit and continue

Skip

*Figure 7 Page 4 of the reporting form. The location entered here is geo-located on the back-end and coordinates mapped in the dashboard.*

## Global Rights Nigeria Incident Report



1 2 3 4 5 6 7 8

### Do you know who did it?

This could be one person or multiple people or a company or organisation.

Yes

Please give us a description of the person/people. Please include how you know them (for example, it could be a relative, colleague, or acquaintance.)

No

Submit and continue

Skip

Figure 8 Page 5 of the reporting form. Text boxes appear based on the option selected.

## Global Rights Nigeria Incident Report



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

This is an anonymous service. Any information you provide will be seen only by staff and volunteers of Global Rights Nigeria.

Try to describe as much of what has happened as you can. You may wish to include what led up to the event, if there were any witnesses, or any sights/sounds you remember from the event.

Description:

Please upload any evidence that could help. This can be photos, videos or any other documents.  No file chosen

Survivor gender

Male

Female

Survivor age

Figure 9 Page 6 of the reporting form.

Page 6 of the form records the main part of the report, a description of the incident, and also some information about the survivor. The decision was taken to place this important page quite late in the process so that reporters would be as comfortable as possible with this before getting into the most sensitive aspects of the report. This page also has an option for the uploading of evidence.

## Global Rights Nigeria Incident Report



1 2 3 4 5 6 7 8

### Have you spoken to anybody about what happened?

Pick all options that apply.

Police or government officials

Somebody within an organisation

Teacher/tutor/lecturer

Friends, family

Submit and continue

Skip

Figure 10 Page 7 of the reporting form.

This page asks for information about any steps the reporter has taken to report the incident outside of the form. This is useful information for GRN as it will help to develop a picture of how reporters have been reacting to the incidents. More information can be added about an option which is selected.

## Global Rights Nigeria Incident Report



1 2 3 4 5 6 7 8

Is there anything else you would like to add?.

Extra notes:

Submit and continue to Resources

Skip

Figure 11 Page 8 of the reporting form.

The reporting form concludes with a space to offer any additional information which is relevant but not covered by other questions. Upon completion of this page the reporter proceeds to the resources page.

## Global Rights Nigeria Incident Report

✓ We've received your report

### What happens now?

Your report will give us the information we need to help other people in the same situation. Thank you.

### For any further help...

If you'd like any more help, or would like to follow up, you can get in touch with us.

Make sure to mention your anonymous alias so we can access any relevant information.

Call us on **814-917-1224**

Visit us at **19, YPO Shodehinde Street, Utako, Abuja**

### Local Resources

Based on what you have told us, we have gathered the closest and most helpful organisations and services for you. These can be of immediate help in concerns regarding health, mental health, legal issues and any other concerns. They are free, anonymous, and almost always available.

Resources found close to *University Road 101017 Akoka,, Yaba,, Lagos State., Nigeria:*

#### Legal aid

##### 9.1km **Wellbeing Foundation**

21 Probyn Road, Ikoyi, Lagos  
thewellbeingfoundation@yahoo.com

*services offered:*

##### 11km **Legal Defence Assistance Project**

11b, Christ Avenue off Admiralty Road, Lekki Phase 1, Lagos  
0813 846 0703, 0819 290 1589

*services offered: legal aid; Mirabel Centre referral; police referral*

##### 11km **Stand to End Rape Initiative**

No 1A, Kola Adeyinka Close Lekki Phase 1  
0809 596 7060 [contact@standtoendrape.org](mailto:contact@standtoendrape.org)

*services offered: counselling; healthcare; legal support; police accompaniment; rehabilitation*

#### Medical help

Figure 12 The final page of the reporting form.

This page makes it clear that the report has been submitted and explains what will happen next, it also reiterates the options to contact GRN directly and quote the auto-generated alias to discuss the report further.

A key part of this final page is the resources section. The reporter can enter a location, this is geo-located and a list of resources they can access, ordered by proximity to that location, is displayed. One of the key aims of the Whistle is to make reporting safer and better for reporters and to try and mitigate issues where reporting can feel like an extractive process. Reporters spend time and may expose themselves to risk or unpleasant emotional responses to submit these reports, and it is our duty to try and offer something in return where possible. GRN already had a list of resources available to survivors of sexual assault, for this campaign we have added these as geo-located and categorised options so that if a reporter enters an address they can see what kind of assistance is available locally and how far away it is.

## 7.2 NGO Dashboard

The NGO Dashboard is where nominated individuals can access submitted reports and work with these. Access is restricted to those who have been given a login, and the read/write permissions of user accounts can be configured for a number of profiles.

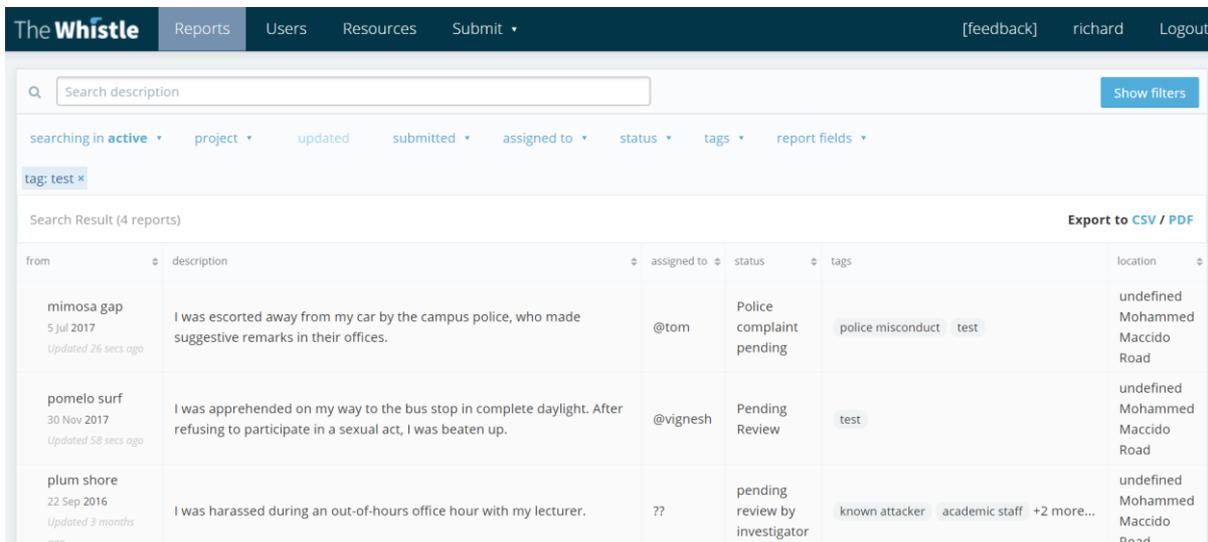


Figure 13 Report list page, with a filter set for the “test” tag

The report list page is currently the landing page for users of the dashboard. By default it lists all reports for that user’s projects, ordered by recency and highlighting reports which are new since the user last visited the page. This page gives an overview of incoming reports and the organisation’s workflow, showing the most important part of each report (description of the incident) along with meta-data like submission and last updated time and information about its status and who it has been assigned to. The page is also equipped with a powerful filtering bar that can be used to select sub-sets of reports based on many criteria (time, status, tags,

and any of the fields contained within the report data. A filtered set of results can be exported from this page either as a CSV file for import to a spreadsheet or as a pdf for printing.

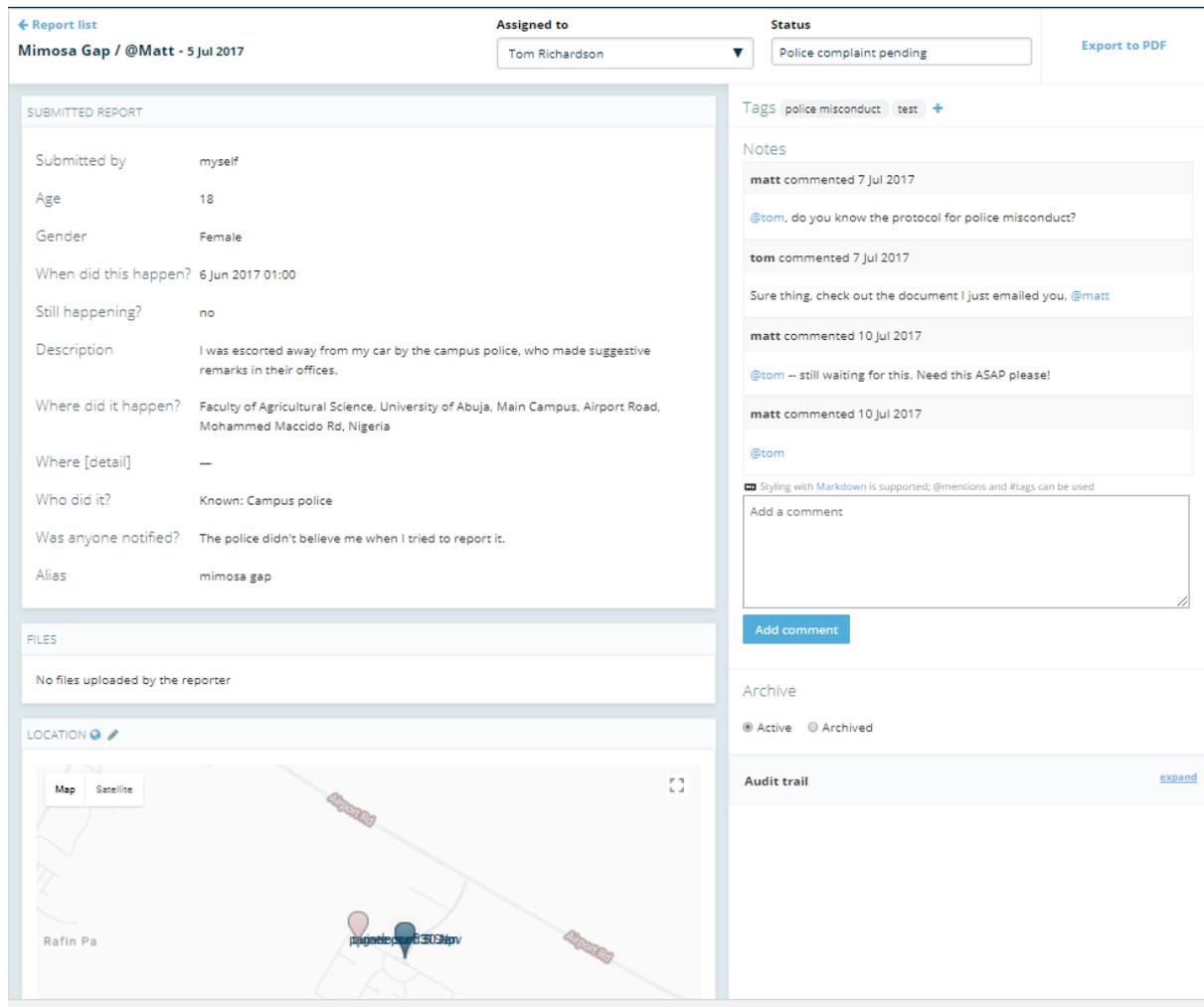


Figure 14 Report Page showing details of a sample report

The Report Page is shown upon clicking through to an individual report. In the top bar for this page is the alias of the reporter and the date of submission, along with drop-down boxes to assign the report to a user or change its status. The status drop-down shows existing status options with an auto-complete feature so that when a user starts typing a status it will show existing statuses where these exist, but also allows for the creation of a new status. This mechanism was selected because it offers a balance between the flexibility to create a new status without going to a special menu, while working against the proliferation of too many status options by showing the existing options that are already in use.

The “Submitted Report” pane in the top-left shows all of the information submitted by the reporter when they made the report. As the reporting form is somewhat flexible and an NGO can run several campaigns at the same time, the structure of this pane is dynamically generated based on the record retrieved from the database. The report shown in Figure 12

was made with an older version of the reporting form and therefore has slightly different data than genuine reports submitted to GRN will have.

Underneath this pane there is space to show any uploaded files (none in this example), and a map view that shows where the report's location has been geo-coded to. The map view focuses on the currently viewed report's location but also shows pins for other incidents that have occurred nearby (or further away if the map is zoomed out). This will help users to identify clusters of incidents that have occurred in proximal locations, and by clicking the pin for a different incident the user is taken to the Report Page for that incident.

The right sidebar is dedicated to user interactions with the report. At the top a list of current tags is shown and more tags can be added through clicking the "+" button, which opens an auto-complete drop-down similar to that used for Status. Under this is a space for notes, where users can leave comments about a report. The comment space supports styling with Markdown, @Mentions can be used to send notifications to other users indicating that a report requires their attention.

The Whistle allows for archiving of reports, this is a special status under which they won't appear by default in the Report List view, allowing that page to be used quickly to track recent reports (with a filtering option to include Archived reports too).

This page also has a space in which the Audit Trail for the report can be opened, this trail tracks every edit to the report page and so one can see which user performed an action like changing a status or assignment.

The Report List and Report View pages are where users are expected to spend most of their time. There are also two other pages that should be mentioned, which appear for users with the appropriate permissions. The Users page shows a list of the users of the instance along with their role, and from this page a user with the appropriate permission can add new users and set their permissions/role. The Resources page lists all of the resources that are available for suggestion to reporters, and from this page a user can edit the details for an existing resource or add a new one.

### 7.3 Planned developments

The Whistle is about to be tested in the field for the first time, and so the development's team priority in the near future will be to improve the platform based on feedback from GRN and analysis of usage logs.

Following recent acceptance of the ChainReact grant amendment, the process of hiring a second full-time developer to work on the Whistle has been initiated. This will bolster the capacity of the development team and will speed up development of the Whistle to suit the next reporting campaigns.

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Also on the agenda for the near term is a front-end test suite which emulates user actions, complementing unit tests which invoke code directly, and integration tests which operate through HTTP requests.

Supporting verification will also be a strong theme for development this year, research with the Cambridge DVC is about to enter its second phase and based on the outcomes of this research it should soon be possible to begin defining core requirements for verification on the Whistle.

The Whistle's strategy has been to work closely with NGO partners to develop a product which meets their specific needs well, and this is also the plan for the next two reporting campaigns. As such, it is difficult to give an exact outline of what development will involve this coming year because that will depend on the NGO partners and use cases, with these not being finalised yet.