



## 2 Background

Like [the instrument server Froid](#)<sup>1</sup>, Samp the Android app will be open and easy to interface any LIMS or LIS to, Free and Open Source, protected on the AGPL, with the intention to attract both FOSS and Proprietary contributions.

Native Android is the best fit. And it needs a name - working title is [Samp](#)<sup>2</sup>, and it might just stick. Thank you universe.

Samp resolves data capturing in remote locations where connectivity is not guaranteed, server syncing when in reach. Some sampling areas in health care, geological exploration and environmental management are really remote.

The complexity brought about by adding Patients and their data will see that addressed in a follow-up project after initial LIMS requirements are fulfilled. [Health Samp](#).

Samp thus applies in disciplines like Water Quality and Environmental Management, Geological and other Surveys at first, for capturing sampling and field results for samples of water, soil, air, drill cores etc.

IBNLT: Images and GPS coordinates from the phone; barcodes for Container and Kit IDs, field results such as temperature, pH, turbidity, humidity etc.

## 3 Server-Android comms

[Bika's JSON API](#)<sup>3</sup> handles text already and for binary data [JSON-Binary functionality](#)<sup>4</sup> can be added either side.

## 4 Use Cases

[Technical updates on the wiki](#)<sup>5</sup>. Here in top-level telegram style, please help us plug the gaps:

### 4.1 Server download

Data to assist Sampling are downloaded to the phone before field trips:

- Packing list - Pre-labelled containers and kits
- Sampling Rounds including pre-created ARs, Sample point list
- Sampling Instructions
- GPS way-point for navigation integration

Only by authorised users - designated sampler and device

### 4.2 Label printing

On-site WiFi/Bluetooth printing to portable printers. Most containers and kits will be pre-labelled at the lab, but not all, and new ones might be required.

### 4.3 Sampling

Google Maps or OpenStreetMap integration assists samplers navigating to sample points

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1 <https://github.com/bikalabs/Bika-LIMS/wiki/GSoC--Froid.-Free-Open-Instrument-Middleware>

2 <http://en.wikipedia.org/wiki/Samp>

3 <https://github.com/bikalabs/Bika-LIMS/wiki/BIKA-JSON-API>

4 <http://stackoverflow.com/questions/1443158/binary-data-in-json-string-something-better-than-base64>

5 <https://github.com/bikalabs/Bika-LIMS/wiki/GSoC--Enhanced-Android-App>

After scanning a Container or Kit ID, Sampling Round or AR barcode or Field Analysis Worksheet, Samp redirects to the object's view for data capturing.

Photos can be captured, say of dry or polluted rivers as Sample Point conditions, including remarks to each image.

Samp captures GPS Coords, including Elevation & Map Projection, of where samples are taken.

#### **4.4 Field Analyses**

Samp allows authorised users to capture field analysis results, e.g. Water temperature, pH, turbidity, Conductivity, etc. and Kit results where applicable, as well as free text remarks.

Field analysis Worksheets for 10" devices will be handy.

Users authorised to do so, should also be able to add Sampling Points, Samples and ARs in the field. This functionality already exists in the current Bika App running on the Motorola Xoom<sup>6</sup>.

#### **4.5 Server upload**

Only by authorised users - designated sampler and device only.

When the sampler returns to base, he/she'll have all the captured data on the phone. Samp connects and load the data to the server and is done.

The data are automatically deleted from the device after a configurable period of time, if the user neglects to.

### **5 Health and Biobank Samp. Phase II**

The real potential of Samp lies in expanding it into health care and resource limited settings, e.g. remote clinics where situations can be as acute as seeing data shipped on memory cards with their samples back to the lab, allowing the device and printer to stay on-site.

Health Samp adds Patients, maybe Doctors and Clinical Cases too, and that needs and requires Patient privacy measures.

Biobank Sampling is another Samp use case with added Patient Consent confirmation attributes.

Veterinary use is another, fighting the dreaded Flying Swine flu in the Australian outback say.

e-Medicine use cases like home diagnosis for 1st world patients should not be excluded,

#### **5.1 Regulations**

Patient Privacy needs to be protected at all times as prescribed by ISO 15189 and CLIA, and data transfers to be done per industry protocol, e.g. HL7.

#### **5.2 Patient IDs**

Positive Patient Identification is THE weakest link in health care sampling, where misidentification can have serious consequences.

Patients who lost their IDs can be identified, if not from alternative IDs such as drivers licenses, voter cards, from images on the device DB: head and shoulder photos, but also of unique features such as tattoos, scars and ethnic markings.

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6 [http://en.wikipedia.org/wiki/Motorola\\_Xoom](http://en.wikipedia.org/wiki/Motorola_Xoom)

These patients can be re-issued with (temporary) barcoded IDs. Users with sufficient authorisation, should also be able to create new Patients.

### **5.3 Field results. Symptoms**

Data captured, ibnlit: Patient ID scans, results such as Temperature and Blood pressure, and from Kits.

In settings with very low doctor to patient ratios, information that can assist them on their Cases should also be captured, e.g.

- Patient Condition: Weight, Pregnant Y/N, Hours fasting
- Symptoms identifiable by the care provider doing the sampling
- Whether Patients responded to messages to report for sampling, they might be sick at home

## **6 Phase III. Phantasies**

Patient Identification from retina or finger print scans.

The most exciting actually would be to use the device for advanced sampling, integrating Bluetooth devices but also using the camera with macro lenses and filters.

Server Data Imports could be explored to include functionality for syncing duplicate Patients say, offering the user options off the database to take care of typos etc, as well as integrity checks on binary data.

Doctors claim video can help them diagnose stroke symptoms say, keep this option open, but it is more suitable for 1<sup>st</sup> world, fast connectivity and hires video.