

Node



Connecting **data and devices** across the healthcare ecosystem

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Why Better Connectivity?

- A programmatic necessity for COVID19, HIV and TB programs with both centralized and Point of Care tests.
- Digitizing and automating data flows improves patient care (time from diagnosis to reporting to treatment) and M&E.
- Most connectivity solutions do not combine data aggregation, data transmission, data display, and remote monitoring.
- Most solutions are tied to a single diagnostic device or manufacturer. Purchase and maintenance of multiple solutions is costly.
- Effective support for installation, service & maintenance, and data analysis has been lacking.



Origin of the Node

- Clinton Health Access Initiative (CHAI) identified deficiencies in the landscape of available connectivity solutions and created a TPP
- CHAI engaged a small group of silicon valley engineers to create a device to meet all the requirements of the TPP (now edgeDx)
- The result of that process was what we call the Node.

The Node is a versatile, open-source, wireless device that enables primary healthcare providers to collect, aggregate, store, view, and share diagnostic results and other critical patient data.

Unlike similar solutions, the Node pairs with devices of all kinds and does not rely on stable Internet connectivity.



Enabling technologies

- Low-cost reliable consumer electronics hardware (BQ smartphone)
- Open source software
- Low-cost cellular data services
- The edgeDx Core Engine
 - Android
 - Linux
 - Server software
 - Relational database
 - Smart router software
 - Interoperation code and UI

Features of the Node

- Secure collection, storage, and transfer of data from any diagnostic platform to any online server/database/dashboard.
- Secure wireless connections to multiple devices simultaneously.
- A local server, hot spot, smart router, user interface, and data display.
- Secure asynchronous cellular connections to insure complete reporting in unstable environments.
- External notification capability (SMS and email) to insure complete Dx reporting and linkage to treatment.
- Fully remote installation, configuration, maintenance, back-up, and restore.
- Locked enclosure for additional safety and security.

Connecting a range of instruments & Dx tests

TESTS

Flu	CT/NG	MRSA/SA SSTI
Flu/RSV	Carba-R Norovirus	MRSA/SA BC
TB	HIV quant (viral load)	TB
COVID-19	HIV qual (EID)	HepC
CD4	HIV/Syphilis RDT	Malaria RDT
MTB/RIF	HCV	vanA for VRE
SA Nasal	GBS	BCR-ABI Ultra

INSTRUMENTS

Roche COBAS
Abbott (Alere) Q Analyser
Cepheid GeneXpert
BD FACSPresto
Rapid Diagnostic tests
Abbott (Alere) PIMA
Abbott M2000



How it works

1 Multiple data sources at the point of care

- The Node receives and stores data locally from multiple sources using Dx instruments, web forms, electronic forms, and photos (Video, voice, and NLP are future possibilities)
- Where possible, data is connected to digital IDs




2 Data is aggregated and cached locally on the Node

- Results can be retrieved locally by providers
- Local database facilitates commodity inventory tracking



3 Structured data is passed to the larger ecosystem

- Multiple data and insights rejoin locally at the Node
- Notifications are sent to health workers and patients via email, SMS, and voice

DATA SOURCES

-  **Rapid Diagnostics Tests (RDTs)**
Provides binary data
-  **Dx instruments**
Provides quantitative data (viral load, etc.)
-  **Clinical notes**
Web forms matching paper forms



Structured data is aggregated and stored locally

-  Bluetooth-compatible
-  Creates Wi-fi hotspot


Data uploads automatically at stable intervals

-  Encrypts data
-  HIPPA compliant



Local Webservice


Cloud
Cloud computing / AI / ML used for analytics


National Health Data (MoH)


LIMS
Laboratory Information Management Systems


Individual open source EMRs
Stored locally


DHIS2
A common population health system

NOTIFICATIONS

-  Email
-  SMS
-  Voice

Our Data Philosophy

- All data belongs to the customer/country.
- Data storage can be local or in the cloud per customer preference.
- Patient forms and dashboards are customized to match existing systems and workflow or custom built.
- Data visualization: Tableau and DHIS2 included, other popular platforms are easily customized.