

Tier DB: A Distributed Database for Medical Records in Philippines and Senegal

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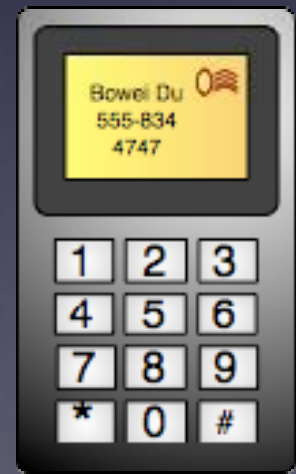
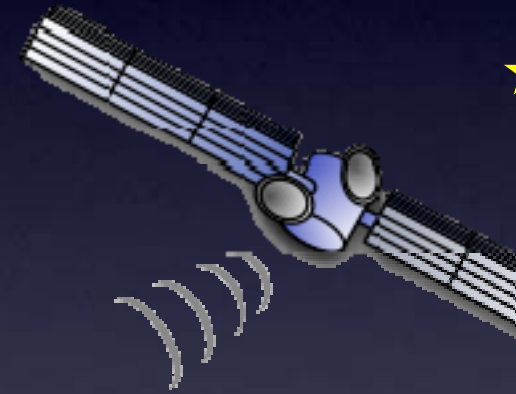
Collaboration with Cedric Festin and Assane Gueye

Applications

- Education: Online encyclopedias (Wikipedia), distance learning
- Healthcare: Patient medical records
- General: Collaboration, shared whiteboard, discussion groups

Challenges

- Limited infrastructure also may redefine what we think of as networking and connectivity...
- Local intranet vs. Internet
- Sneaker-net (buses, motomen)
- SMS/GPRS
- Connectivity can be intermittent and

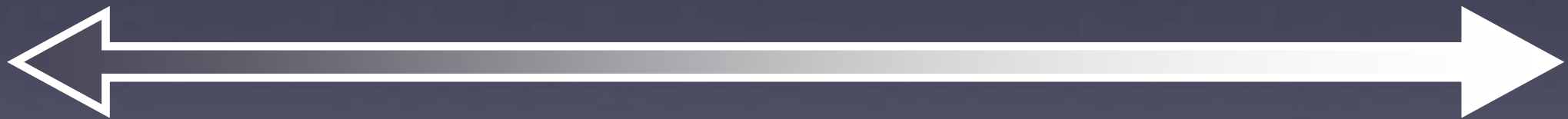


Challenges

- Many existing applications are built assuming always online connectivity
- However, application usage model doesn't always require this:

SMS, voicemail

tele-conferencing



Wiki, Medical
Records

Research

- How to use the heterogenous and intermittent communications as a cohesive network?
- **Delay-Tolerant Networking (DTN)**
- How do we make it easy to build applications?
- **TierStore**: Distributed file system for DTNs
- **TierDB**: Simple distributed database

TierStore/TierDB

- “Sync” for file systems/databases
- Cost and time: Data prioritization, scheduling and transmission
- Asynchrony: Mechanisms for handling concurrent update conflicts
- Ease of development: Layers on top of existing systems (File systems/Databases)

Projects

CHITS Medical Record System

- **Community Health Information Tracking System**
- Built by group headed by Dr. Alvin Marcelo at the University of Philippines National Tele-health Center
- Replaces existing error-prone logbooks
- Deployed in ~18 health centers
- Written as a Intranet web app within health center (PHP + MySQL)

CHITS Medical Record System

REGISTRATION > HOME FAMILY FOLDERS RECORDS TODAY'S PATIENTS APPOINTMENTS LABORATORY MC FOLLOW

SIGN OUT

Angelita
ANGELISTA 11
m Quezon logged
from
2.168.2.191.
Please do not forget
to sign off.

Sign
Out

PATIENTS

Patients 21
Modules 41
Forms 567

MERCADO, JENNELYN

FAMILY NUMBER 12 AGE: 34.7Y/F BIRTHDATE: 1971-12-25

PATIENT ID: 0000013

TOTAL VISITS: 1 LAST VISIT: Tue 22 Aug 2006, 04:07PM

ELAPSED TIME: Aug 22 2006, 04:07 PM 18.67H elapsed

VISIT DETAILS

APPTS

VITAL SIGNS

LABS

NOTES

DRUGS

PATIENT GROUP

- Diabetic
- Family Planning
- Hypertensive
- Maternal Care
- TB Therapy

SEE PHYSICIAN?

- Will see physician
- Will not see physician

Save Details

PATIENT GROUP

none

PATIENT GROUP HISTORY

No records.

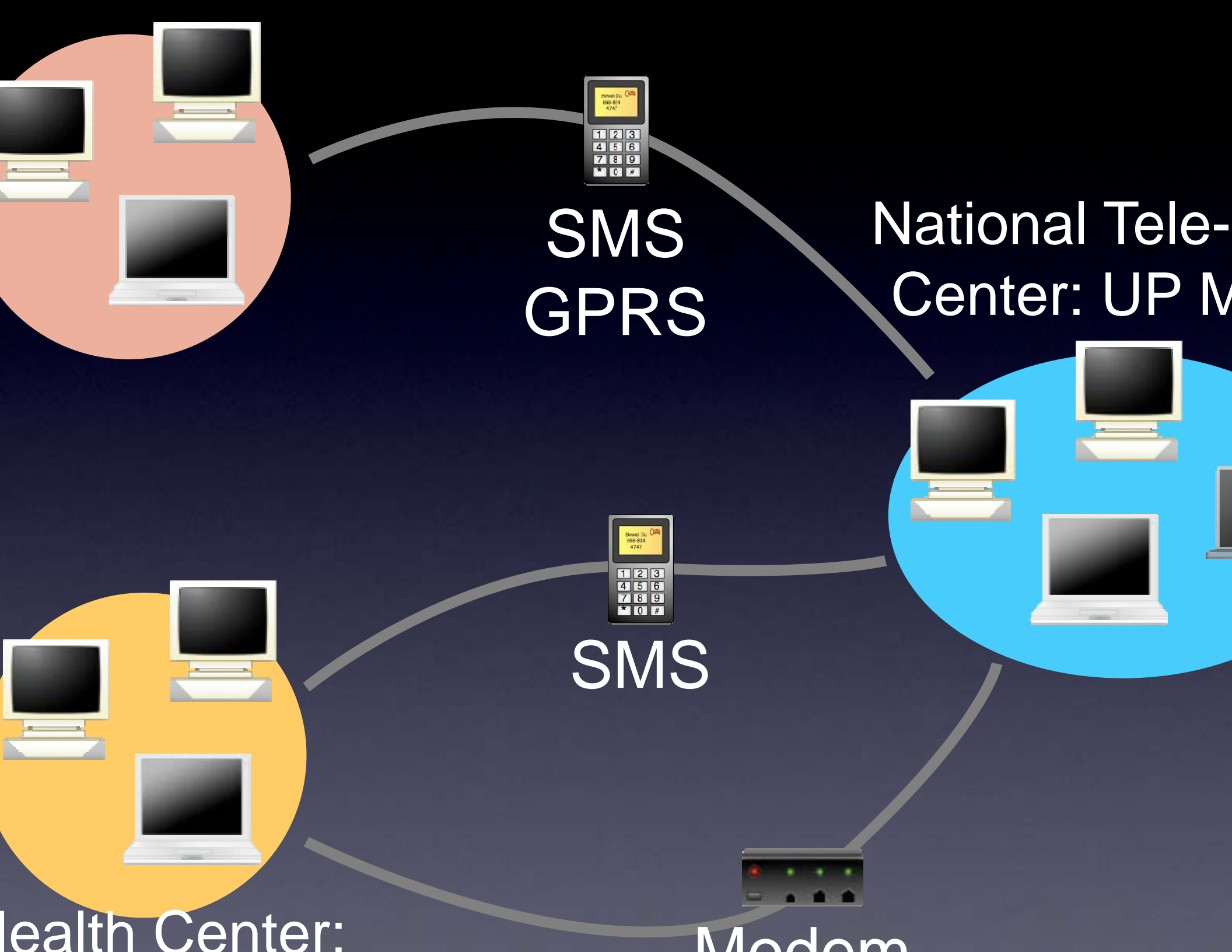
CONSULT MODULES

- [Module - Health Center](#)
- [Module - ICD10 Codes](#)
- [Module - IMCI](#)
- [Module - Injury](#)
- [Module - Notifiable Dis](#)
- [Module - Philhealth](#)
- [Module - Clinical Remi](#)
- [Module - Vaccine](#)

PREVIOUS VISITS:

CHITS

- Final data collection is still time consuming: done by site visits from staff
- Patient mobility result in duplicate, inaccurate records.
- The Philippines has no universal identification system
- No mechanism for patient referral



SMS
GPRS

National Tele-
Center: UP M

SMS

Modem

Health Center:

Operating Constraints

- Health centers communications budget: ~\$20/month.
- Adapt to various forms of available communications: SMS, GPRS, dial-up modem, broadband
- Data with different priorities
 - New patient records by the end of the day
 - Other records are weekly, monthly reports

CHITS

- Site visit next two weeks
- Test viability of various forms of communications (SMS/GPRS/dialup)
- Prototype test and pilot deployment (February 2009)

Senegal Schools

- Two schools: Touba and Porokhane, ~700 students
- No existing records system
- Visiting doctors do checkups at the schools, annotate during a visit to hospital
- Build a simple, synchronized record system

More information

- Other projects?
- <http://code.google.com/p/neondb/>