Three strategies for functional architecting: Cases from the health systems of developing countries

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Introduction

- Paper springs out of observations within HISP, concerning the development of the DHIS2 software
- Specifically, what (intentionally or not) decides **configurations of software components** (with people, organizations etc) and the corresponding **development of new functionality** in said software
- We term this "functional architecting"

- DHIS was originally designed for handling routine statistics. A lot of "pressure" to expand on this, and in new directions

Functional architecting

- "The activity of a variety of actors involved in configuring and re-configuring the functional roles of independent but related software components"
  - Software components offering complementary or duplicate functionality, controlled by different actors
  - Outcome of concrete configuration of components
  - Interplay of both configurations and software development
  - Example: Sierra Leone; HMIS, HMIS2 (specific disease), HRIS, ARV-tracking
  - A focus on context-specific domains

Domains?

- Analytical division:
  - Nature of information (text, numbers)
  - Business processes/logics
  - No clear cut boundary, often overlapping

- Example: HMIS, inventory, logistics

One abstraction level of domains for health

- General management (statistics, monitor trends, resources, outcomes..)
- Patient management (personal information, history, symptoms, diagnoses, etc)
- Lab systems (samples, tests, results, alarms)
- Logistics MIS (suppliers, batches, pick-lists, distribution, fleet management, inventory management)
- Human resources MIS (staff, qualifications, posts, wage..)

- Box-diagrams, representing a) context-appropriate divisions, and b) usually different software

"Pressures" on DHIS

- Originally for routine, aggregate health data
- Tracker
  1. More than a reporting system, I also want a system which can tell me when a due date is for my pregnant woman; it is difficult to calculate delivery dates by hand" (ANM, India, Gizaw 2011)

  2. Generification processes….

  3. "The DHIS2 tracker currently does not aim at becoming an advanced EMR system to support clinical care" (www.dhis2.org)

Logistics

- "Looking at some articles on DHIS, I was wondering whether we could use it as a Logistics Managment Information System to follow up on HIV, TB and malaria medicines in the health facilities and prevent stock out with an alarm system" (International NGO)
  - Quite feasible in DHIS2 now, except for the alarm system

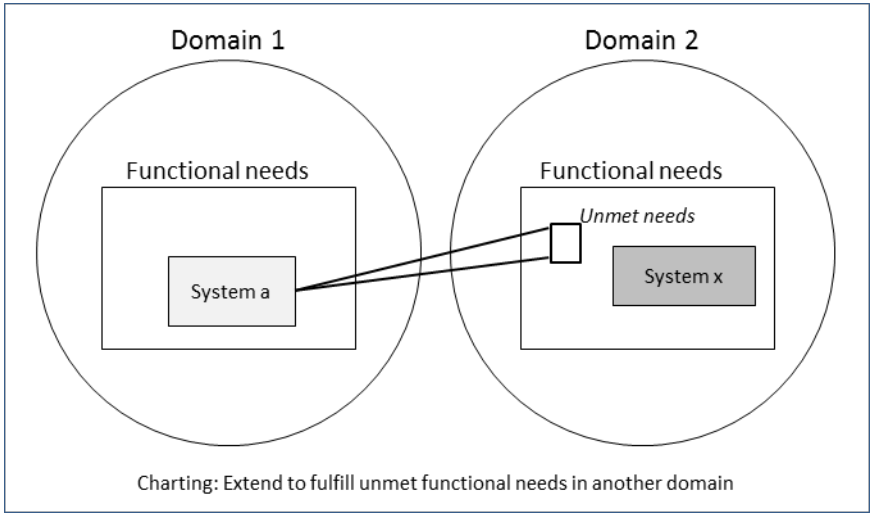
- Many more examples, covering a wide spectrum from "keep track of how much we have", to "forecast, procure, follow batches with bar-codes, keep track of expiry dates"

Three strategies

- Charting, encroaching, connecting, as ways to respond in cases where there is pressure on DHIS to relate to or move into new domains, or where other actors are moving into the domain of DHIS

Charting

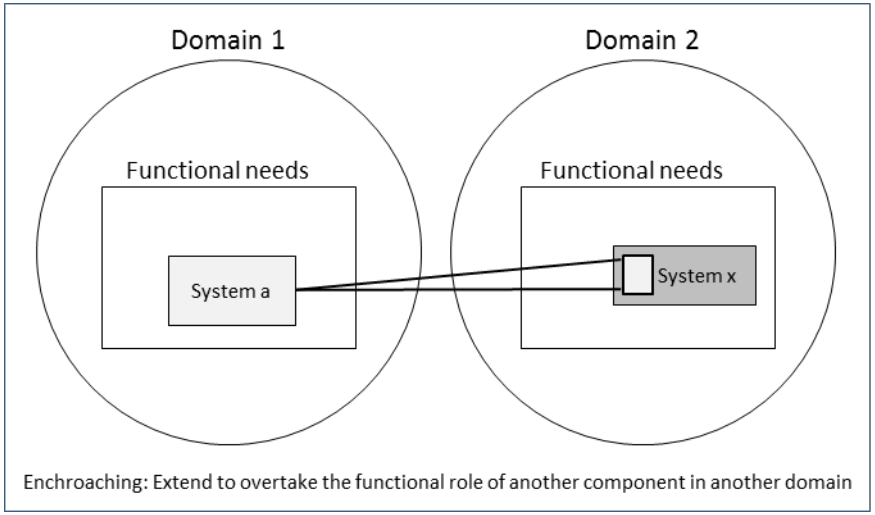
- Extending an existing software component with additional functionality to cover an unmet functional need in a new domain
- Example: tracker in India



Charting: Extend to fulfill unmet functional needs in another domain

Encroaching

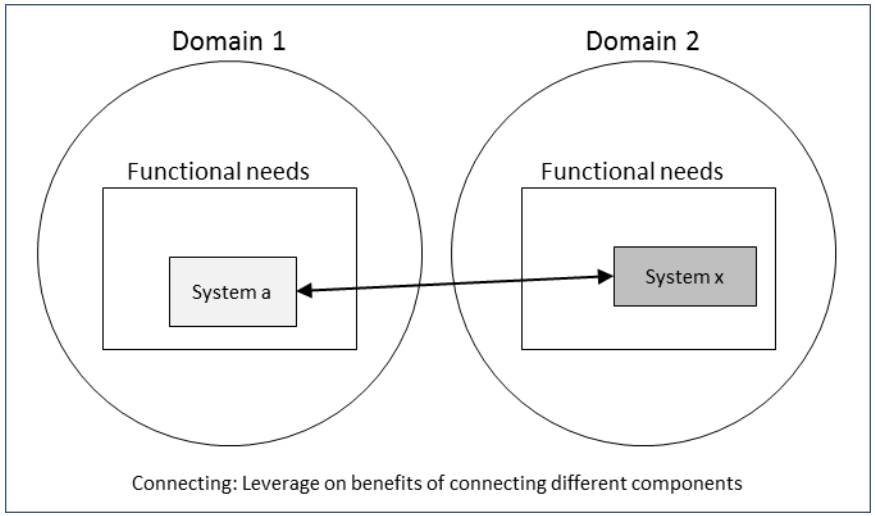
- Extend a component into a new domain with functionality that is already implemented and available in that domain
- Example: early intention of developing DHIS2 as LMIS in Sierra Leone



Enchroaching: Extend to overtake the functional role of another component in another domain

Connecting

- Deciding on functional roles and responsibilities of complementary software components
- Example: eventual "agreement" on LMIS and HMIS in Sierra Leone



Connecting: Leverage on benefits of connecting different components

The three strategies

- Charting frequently used/seen strategy of DHIS
- Unmet needs in many developing countries, unavailability of appropriate solutions
- Not necessarily us as implementers and developers of DHIS2 driving this (contrast with SAP, Pollock and Williams)
- Perhaps better to think of them as "patterns"