

A New Behavioral Health Platform for Information Exchange in the Netherlands

Koppeltaal on HL7® FHIR®



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Introduction

Dutch behavioral healthcare providers are investing in eHealth in order to support blended care plans, which mix face-to-face treatment with self-directed work in eHealth interventions. These interventions are increasingly developed by independent companies which is an integration challenge for the existing EHR systems and eHealth platforms.

The Challenge

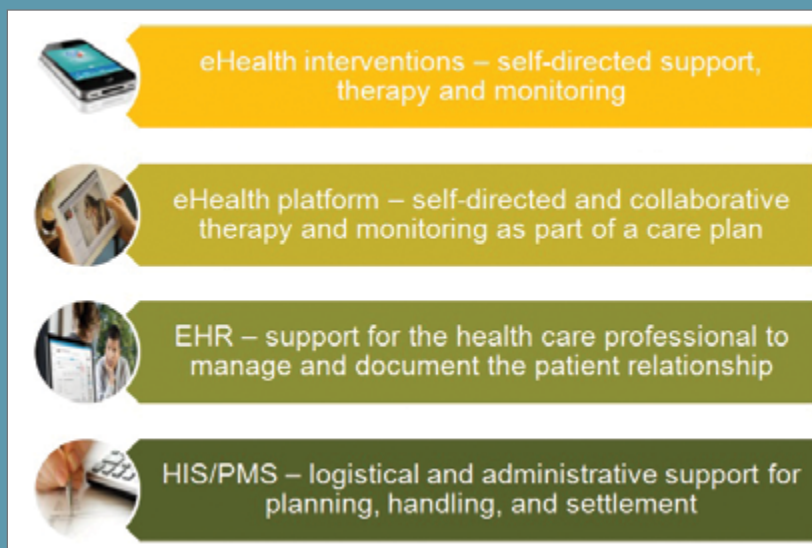
Given the evolution of health IT, behavioral health institutions are facing a multitude of applications that have to talk to each other. Until recently, no such large scale integration effort had been necessary, as most of the work was supported through a single EHR that also included logistical and administrative support. Faced with the eHealth investments, architecture of typical behavioral healthcare providers is evolving to a four-tier model as illustrated in Figure 1.

The lowest layer is formed by the traditional hospital information system (HIS) or practice management system

(PMS) for non-hospital providers of behavioral healthcare. The electronic health record (EHR) has been in place for a few years and tends to be focused on the legal requirements for documentation, rather than true support for the work of the professional. For the purpose of providing blended healthcare, a few eHealth platforms have evolved. They provide a common place of interaction for patients and professionals, including secure messaging, online therapy modules, and assessment tools. More sophisticated self-directed interventions are being developed by niche players that stem from the serious gaming or virtual reality industry.

Individual providers will choose a single eHealth platform for engaging their patients in blended care. However, they do want to take advantage of new and highly effective interventions that are being developed independently, often in the form of online and sometimes multiplayer games that address behavioral problems. The key challenge is to provide integration between independently developed eHealth

Figure 1: The four-tier model of information systems in behavioral health



interventions and the eHealth platform of choice of the provider of behavioral healthcare.

Joining Forces with HL7

Supported by health insurance companies, the Dutch behavioral healthcare sector has joined forces to develop a shared integration language and service to share data between eHealth interventions and eHealth platforms. This has the following benefits:

- Patients can work more independently on improving their condition and self-reliance. It is also easier to involve their family and friends
- Behavioral health institutions have more flexibility in what they offer patients and will lower both the costs of labor and of IT
- eHealth platform developers can increase their market reach and broaden their product portfolios
- Health insurance companies obtain better care at lower costs

HL7's Fast Healthcare Interoperability Resources (FHIR®) emerged as the best standard to implement the architecture of what is now called "Koppeltaal" (which is Dutch for 'Connectivity Language'). Applications can register with the Koppeltaal server and use a publish subscribe model to share data. In its first version, Koppeltaal supports the exchange of HL7 FHIR messages between eHealth platforms and a game for children with autism. The architecture of Koppeltaal is visualized in Figure 2.

Each provider of behavioral healthcare is free to choose their own eHealth platform. Through the connection with the Koppeltaal Server, they can include all available eHealth interventions, independent of the eHealth platform chosen.

Including eHealth interventions is simple. The language supports the identification of specific eHealth interventions in the specification of an individual care plan for a patient in the eHealth platform. The patient will then be provided with the link to the appropriate intervention, which is already aware of the key patient details. Conversely, the eHealth intervention is able to communicate back the key achievements of the patients in using the

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game or other intervention, to be included in the therapy overview in the eHealth platform.

HL7 FHIR and the Support of FHIR API's

As mentioned, HL7 FHIR emerged as the best standard to implement the Koppeltaal architecture. The key reasons for choosing FHIR are its built-in flexibility, its alignment with current internet standards, its extensibility, and its profile mechanism. The Koppeltaal server uses one of the FHIR reference implementations, the open source FHIR API for .Net. This library is maintained and supported by the company Furore from Amsterdam, The Netherlands. The founding father of the .Net API, Ewout Kramer, is on the core specification team of the HL7 FHIR standard, together with Grahame Grieve from Australia and Lloyd McKenzie from Canada. The

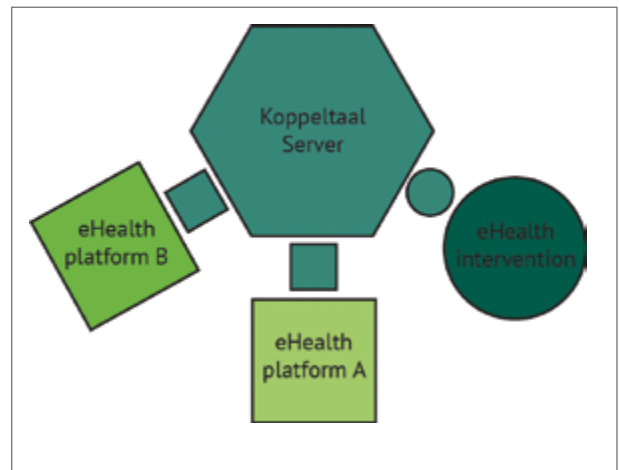


Figure 2: Visualization of the Koppeltaal architecture. Koppeltaal means 'Connectivity Language' in Dutch.

fact that the open source APIs for FHIR (besides the .Net one there are also Java and Delphi reference implementations) are widespread and used by a fast growing community, was important for the Koppeltaal Foundation to be able to make the decision to rely on FHIR.

Achievements and next steps

The first version of the Koppeltaal Server and its initial interfaces were tested in December 2014. Koppeltaal now runs in beta and is being adopted by the eHealth platforms one by one. The beta version was demonstrated to high acclaim at the 3rd HL7 Netherlands Working Group Meeting in April 2015, as part of the close collaboration with the HL7 Netherlands FHIR team. After phase 1, Koppeltaal expects to extend the language and service to connect to EHR and Routine Outcome Measurement (ROM systems). The International FHIR Developer Days on November 18-20, 2015, will provide a great opportunity to work with the Koppeltaal specifications and to provide input for its further development. ■