Postmodern EHR

Tomaž Gornik
CEO, Marand
Co-chair, openEHR Foundation
Coordinator, Slovenian ECHA Ecosystem
TOMAŽ GORNIK

› co-founder and CEO, Marand
› co-chair, openEHR Foundation
› coordinator, European Connected Health Alliance Ecosystem
› experience in software for:
   › telecomms
   › healthcare
AGENDA

1. INTRODUCTION
2. POST-MODERN EHR
3. HEALTH DATA
4. EXAMPLES
5. USE CASES
HEALTHCARE IS CHANGING

NATURE OF ENCOUNTER

AUTOMATED COGNITIVE PROCEDURES

HOSPITAL CLINIC/PRACTICE HOME ANYWHERE

PHYSICALLY PRESENT CONNECTED REMOTE NOT INVOLVED

CLINICIAN LOCATION

PATIENT LOCATION
Walmart Announces Ambitious Goal: 'To Be The Number One Healthcare Provider In The Industry

Walmart doesn’t settle for second place: The nation’s #1 retailer just said it wants to be the #1 health care provider in the retail industry, too.

The company’s statement came on Monday, alongside an announcement about Walmart’s new health insurance initiative.

Under Walmart’s new partnership with DirectHealth.com, about half of 4,300 Walmart’s stores will feature DirectHealth.com licensed agents, who will help consumers shop for health insurance and navigate Obamacare’s health insurance exchanges.

The program, known as Healthcare Begins Here, begins on Friday Oct. 10 and will run for two months. Not coincidentally, the Medicare open enrollment period begins next week, and the open enrollment period for the Affordable Care Act’s health insurance exchanges begins in November.

Also See: Health Care For $4: Are You Ready For Walmart To Be Your Doctor?

“This approach is similar to what we saw with Walmart’s retail clinic strategy, where they leased space in their stores to local health systems rather than operating their …
Greater Manchester £6bn NHS budget devolution begins in April

© 27 February 2016  Manchester

Greater Manchester will control a combined NHS and social care budget of £6bn

Greater Manchester will control a combined NHS and social care budget of £6bn. The region's 10 councils and health groups will take over £6bn allocated for health and social care, with full powers being devolved a year later.

Source: www.bbc.com
"We will ensure that the EHR is built from “the ground up” and will see clinicians play an active role in designing an intuitive system."

- Richard Corbridge
  Chief Information Officer

Source:
www.irishexaminer.com
2 POSTMODERN APPLICATIONS
CURRENT SYSTEMS

› Lack of interoperability between vendors, technologies, applications
› Difficult implementation, high cost
› Out-dated interfaces, bad design, missing functionality, time consuming
› Quality of data, errors, data difficult to find
› Lack of mobility, support for devices
"Traditional **monolithic** ERP solutions using a **closed business architecture** were designed to support the process improvement **needs of the past** (such as transactional efficiency and data integrity)."

- Gartner, 2015
“They cannot enable the open and agile needs of business to succeed in a digital economy that demands new products and services and the ability to respond to new business moments.”

- Gartner, 2015
ERP EVOLUTION: BEST-OF-BREED

PRE-1997
BEST-OF-BREED

Order Management Manufacturing (Mainframe)

Collections/AR (Custom)

GL, AP, FA (Package)

HR (Package)

Payroll (Outsourced)

NO CORE ERP
MULTI-VENDOR
FUNCTION-ORIENTED
ERP EVOLUTION: MODERN

PRE-1997
BEST-OF-BREED

ERP SUITE

1998-2014
MODERN ERP

NO CORE ERP
MULTI-VENDOR
FUNCTION-ORIENTED

CORE ERP
SINGLE VENDOR
DATA-ORIENTED

Collections/AR (Custom)

GL, AP, FA (Package)

Payroll (Outsourced)

AR
AP
GL

FA
Inventory
Payroll

Order Management Manufacturing (Mainframe)

HR (Package)

Order Management

Manufacturing
ERP EVOLUTION: POSTMODERN

PRE-1997
BEST-OF-BREED

1998-2014
MODERN ERP

ERP SUITE

2015 -
POSTMODERN ERP

CORE ERP

NO CORE ERP
MULTI-VENDOR
FUNCTION-ORIENTED

CORE ERP
SINGLE VENDOR
DATA-ORIENTED

CORE ERP
MULTI-VENDOR
PROCESS-ORIENTED

Collections/AR
(Custom)

GL, AP, FA
(Package)

Orders
Manufacturing
(Mainframe)

HR
(Package)

Payroll
(Outsourced)

Payroll
(Outsourced)

Collections AR

ERP SUITE

AR | AP | GL
---|---|---
FA | Inventory | Payroll
Order Management | HR | Manufacturing

Payroll (Outsourced)

CORE ERP

GL
AP
FA
Inventory
Payroll
Order Management
HR
Manufacturing

E-Recruit

Talent Management
POSTMODERN

USES

› Multi-vendor components
› New deployment models (hybrid, cloud)
› New technology (Mobile, Big Data, IoT, In-Memory, Process, Rules)

ENABLING

› Improved usability and user adoption
› Agility and flexibility (less lock-in)
› Cost effectiveness
› Differentiation and innovation
3 HEALTH DATA
TODAY’S APPLICATIONS

THE INTERNALS OF AN APPLICATION

USER INTERFACE

PROGRAMMER CONTROL

NO VISIBILITY

LIMITED AGILITY

INTERNAL CONTROL STRUCTURE

PATHS OF EXECUTION

DECISION POINTS

DATA DEFINITIONS

THE INTERNALS OF AN APPLICATION
NEXT-GEN APPLICATIONS

THE INTERNALS OF AN APPLICATION

USER INTERFACE

PROGRAMMER CONTROL

PATHS OF EXECUTION

NO VISIBILITY

DECISION POINTS

LIMITED AGILITY

DATA DEFINITIONS

INTERNAL CONTROL STRUCTURE

THE INTERNALS OF AN APPLICATION

CONTROL STRUCTURES AND CONTEXT FLOW

TURNING THE APPLICATION INSIDE OUT

PORTALS AND WEB

RULE ENGINES

EXPLICIT PROCESS ENGINES

XML AND DATABASES
NEXT-GEN APPLICATIONS

THE INTERNALS OF AN APPLICATION

USER INTERFACE

PATHS OF EXECUTION

DECISION POINTS

DATA DEFINITIONS

PROGRAMMER CONTROL

NO VISIBILITY

LIMITED AGILITY

INTERNAL CONTROL STRUCTURE

CONTROL STRUCTURES AND CONTEXT FLOW

PORTALS AND WEB

RULE ENGINES

EXPLICIT PROCESS ENGINES

XML AND DATABASES

TURNING THE APPLICATION INSIDE OUT
HEALTH DATA

PAST

VENDOR DEPENDENT, PROPRIETARY DATA

APPLICATION A  APPLICATION B  APPLICATION C
VENDOR DEPENDENT, PROPRIETARY DATA

PAST

APPLICATION A

APPLICATION B

APPLICATION C

DATA MIGRATION

CONVERSION EVERY 7–10 YRS

DATA LOST

CONVERSION EVERY 7–10 YRS

DATA LOST

www.marand.com
SOLVED FOR IMAGES AND DOCUMENTS

PRESENT

APPLICATION A

APPLICATION B

APPLICATION C

IMAGES
PACS

DOCUMENTS
HL7 / CDA
WHAT ABOUT STRUCTURED DATA?

PRESENT

3 PETABYTES OF NEW STRUCTURED HEALTH DATA PER DAY (IN US)
VENDOR INDEPENDENT, OPEN DATA

FUTURE

APPLICATION A
IMAGES
PACS

APPLICATION B
DOCUMENTS
HL7 / CDA

APPLICATION C
STRUCTURED
DATA
ARCHITECTURE

CLINICAL APPLICATIONS/SERVICES
MULTI-VENDOR

PATIENT FACING APPLICATIONS
MULTI-VENDOR

CLINICIAN PORTAL
APPS
DECISION SUPPORT
DEVICE CONNECTIVITY

PATIENT PORTAL
APPS
DEVICES

HEALTH INFORMATION ACCESS LAYER

Connectivity & Transformation & Routing
Process & Orchestration
Management & Monitoring
Security & Privacy

SERVICE BUS

MASTER PATIENT INDEX
TERMINOLOGY
PROVIDER REGISTRIES

DATA WAREHOUSE

CLINICAL DATA REPOSITORIES

IMAGES PACS
DOCUMENTS HL7 / CDA
STRUCTURED DATA
DETAILED CLINICAL MODELS
**DIABETIC CHECKUP**

**ISSUE**
Tingling feet, feeling tired

**WEIGHT**
76 kg

**BLOOD PRESSURE**
124/92 mmHG

**HbA1c**
7.5 %

**ASSESS**
Excellent control

**CARDIOLOGY VISIT**

**ISSUE**
High Blood Pressure

**WEIGHT**
66 kg

**BLOOD PRESSURE**
192/114 mmHG

**PULSE PRESSURE**
78 mmHG

**spO2**
92%

**ASSESS**
NAD, see 4/52
An open, **domain-driven platform** for developing flexible e-health systems

- **Separation** of content and technology
- **Computable** data & terminologies
- Two-level modelling
  - **Archetypes** – maximal data set
  - **Templates** - data set for use case
- **Querying**
- **Multi-lingual**
STANDARDS ORGS
PROFESSIONAL BODIES

GOVERNMENTS
MoHs

VENDORS
INTEGRATORS

PHYSICIANS + PATIENTS
USE SOLUTIONS

TERMINOLOGY
ARCHETYPES

TEMPLATES

OPERATIONAL TEMPLATE

TOOLS

GUI
TDO
XSD

PRESENT’N
APIs
SERVICES

COLLABORATIVE KNOWLEDGE REPOSITORY

EXECUTION PLATFORM

BUILD ARCHETYPES & TERMINOLOGY THAT DEFINE THEIR INFORMATION E.G. VIA IHTSDO

BUILD TEMPLATES AND ISSUE AS STANDARDS, E.G. DISCHARGE SUMMARY

CONSUME STANDARD TEMPLATES AND CREATE THEIR OWN, MAKING OPTs

DEVELOPERS BUILD SOLUTIONS BASED ON THE PLATFORM

BUILDers

TOOL

TOOL

TOOL

TOOLS

TOOL

www.marand.com
OPEN EHR

› **Semantic coherence** in the application stack (all layers of software know what the data mean)
› A high level of **re-use** of artefacts – define once, reuse and generate many times
› A single, **stable reference model** for sharing clinical and related information
› A standardised query language for writing **portable queries**
› A standardised, re-usable way of connecting to **terminology**
EXAMPLES
REFERENCES
“Think!EHR Platform™ has the ability of providing scalable and adoptable solutions which are very needed to improve global healthcare. There is a tremendous amount of potential here.”

- Marc Perlman

Global Vice President,
Healthcare and Life Sciences Industry
“The maturity of Think!EHR Platform™ and the flexible support from Marand has been central to this, and we see the ability to exchange information through the common data platform as critical in wider integration of this and other products.”

– Richard Jefferson

Head of Programme Commissioning
NHS England
City-wide Electronic Health Record

Scope:
- 428 policlinic institutions
- 76 healthcare centres
- 12 million patients
- 161 millions visits/year
- 130,000 system users
- 45,000 physicians
- 1B documents, 25 TB of data
City-wide Electronic Health Record

Clinical and analytical infrastructure providing a centralised, vendor-neutral EHR

Solution:
- Think!EHR Platform as clinical data repository
- Platform APIs for all development
- openEHR and IHE XDS
- IHE XDS for electronic document sharing
City-wide Electronic Health Record

Clinical and analytical infrastructure providing a centralised, vendor-neutral EHR

Benefits:
- Common data platform for all applications
- All clinical data in an open, structured format (openEHR)
- Technology and vendor neutral, less lock-in
- Powerful querying and analytics
- Deployed in a private cloud
SLOVENIA
Think!
Clinical
SLOVENIA
Think!
Clinical

Children’s Hospital
UMC Ljubljana

Scope:
› 230 bed paediatric hospital
› part of 2,200 bed UMC Ljubljana
› all specialities including ICU, surgery
› full CPOE
› HIMSS EMRAM Stage 6 - pending
› fully based on openEHR platform
USE CASES
USE CASES

› EHR systems
› eHealth Infrastructure
› Ecosystem of partners
VALUE IN USER EXPERIENCE

PLATFORM APPROACH ALLOWS MORE TIME FOR FRONT END

TIME SPENT ON BACK-END

DEVELOPMENT
SECURITY
DATA MANAGEMENT
INTEGRATION

DEVELOPMENT
SECURITY
DATA MANAGEMENT
INTEGRATION
PLATFORM AS A SERVICE

Build amazing healthcare apps and services

open API + open Data = open Health Data Platform

A simple yet powerful API  Healthcare computing as a service  By developers for developers
SUMMARY

› Healthcare is changing
› Today’s monolithic applications can’t cope
› ERP went from B-o-B to Megasuite to Postmodern
› The same will happen with healthcare applications
› The future is multi-vendor
› Vendor-neutral health data is a key asset
› openEHR provides a proven platform to build new applications
“It is not the strongest or the most intelligent who will survive but those who can best manage change.”

- Charles Darwin
THANK YOU!

Tomaž Gornik
CEO, Marand
Co-chair, openEHR Foundation
Coordinator, Slovenian ECHA Ecosystem

tomaz.gornik@marand.com
www.marand.com
www.ehrscape.com