The Three Dimensions of SOA in Healthcare: Organization, Business and IT

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Core Ideas

- Service Orientation is an Enterprise wide Architectural Pattern
- It is a Pattern of Survival validated by 3.5 billion years of evolution
- Its General Value increases in Changing Markets
- It is not Technology driven; technology amplifies its benefits
- There are no magic bullets
Clarifying some terms

- **Agility**
  - (business context) the capability of rapidly and cost efficiently adapting to changes.

- **Maturity Scale (OMG)**
  - Levels: 0 – no awareness, 1 – Initial, 2 – Managed, 3 – Standardized, 4 -Predictable, 5- Innovative

- **Normalization**
  - The process of finding a base in a vectorial space

- **Nyquist theorem**
  - If a function $x(t)$ contains no frequencies higher than $B$ hertz, it is completely determined by giving its ordinates at a series of points spaced $1/(2B)$ seconds apart.
Bogdan’s view of SOA
Systemic View of Life
AUTOPOIESIS (1973)

- Francesco Varela and Humberto Maturana
- Meta-pattern of autopoiesis:
  - a process whereby a system, organization, or organism produces and replaces its own components and
  - distinguishes itself from its environment
- Autopoietic pattern applies to:
  - Biological entities (cells, multi-cellular organisms, animal reign)
  - Informational Entities (ai, ca)
  - Social Entities, Families, Tribes and Organizations

(J.G. Miller - Systems Theory, Anthony Stafford Beer – management cybernetics (SIGMA founder), Niklas Luhmann – social systems theorist)
A quick History of Life on Earth

- Big Bang – 15 billion years ago
- Our solar System – 4.5 Billion years
- Oldest mono-cellular fossil – 3.4 billion years
- Oldest fossil of specialized cell colony – 1.4 billion years
- Oldest fossils with internal org – 0.6 B
- Hominids – 0,003 B (3 million)
- Social Hominids – 0,00003B (30,000)
- Corporations – 6000
- Healthcare Corporations - 1500
- Bogdan doing SOA – 7
- SOA in Healthcare conference - 0
Service Orientation
A Pattern for Corporate Survival

● Is a feasible EA pattern of securing:
  – Organization efficiency and
  – Organization agility

● Involves:
  – Differentiation
  – Integration
  – Evolution

● Secures corporate autopoiesis in a changing environment

“An effective strategy for SOA requires a clear understanding of SOA and an intelligent, evolutionary approach to building SOA maturity. “ Forrester 2009
Healthcare: why change?

- The three revolutions in Healthcare
  - Specialist centered
  - Person centered
  - Prevention centered

- Current Healthcare Challenges
  - Increase Healthcare Costs
  - Changes in Demographics
  - Changes in Customer Involvement
  - Change in Healthcare Profile (epidemics, immune..)
  - Impact of new technologies

"Never let a crisis go to waste"
Rahm Emanuel, President Obama’s chief of staff,
SOA Benefits

- Application of SOA is **forecasted to show:**
  - 17-20% reduction in IT costs (Forrester research 2007, Gartner research 2008, misc. CIO reports).
- Factual results in order of relevance:
  - Process Decluttering
  - Promotion of Best of Breed practices
  - Reuse of past investments in legacy assets
- A note – none of the above benefits tap into the agility feature.
SOA Features

- An evolutionary process
  - morphs current into future (being and becoming)
  - Locally grown (not off the shelf)
  - It never ends

- Delay between effort and effect
  - Needs critical mass
  - Needs executive commitment
IMPLEMENTATION OF SERVICE ORIENTATION

● Methods
  − Differentiation
  − Evolution
  − Integration

● Over all Dimensions of Enterprise Activity
  − Social (organization)
  − Business
  − Technology (IT)
Service Orientation
Trends of Knowledge production

GOOGLE TRENDS SEARCH

OMG Maturity Levels:
SOA IT – Level 4-5
SOA BMP – Level 3
SOA ORG – Level 1

Equalization of maturity levels
SOA Strategy Healthcare

DIFFERENTIATION
- business line
- competence
- geography
- normalization
- social orchestration

EVOLUTION
- SWOT
- Outcomes Realization
- Change, Acquisition
- Mergers, Outsourcing
- Incentives Realignment

INTEGRATION
- Vision building
- Unified Governance
- consensus building
- shared knowledge
- trust, transparency

SOCIAL
(ORGANIZATION)

BUSINESS

TECHNOLOGY
(IT)

* decomposition
* normalization

* decomposition
* normalization

* Prototyping
* Benchmarking
* Patterns
* Dynamic Orchestration

* Simulation and metrics
- metrics of performance
- maturity metrics
- value chain

* BPM orchestration
- Reference model
- Policies, Contracts
- Semantic
- Open Standards

* ESB
- Composition
- Policies, Contracts
- Data Models
- Virtualization, Clouds
- Open Standards
Service Orientation Organization Level

- **Differentiation**
  - By business line, competency, geography, customer culture, market segment
  - Acquisition, partnerships, outsourcing, contracting, mergers
  - Added specialization – orchestration (governance and catalyst)
  - Normalization of membership

- **Evolution**
  - SWOT Analysis
  - Stakeholder Matrix update (vision, goals, expectations, value)
  - Membership based on Outcomes Realization
  - Incentives realignment, directional funding, training, re-purposing.

- **Integration**
  - Shared vision, goals, values
  - Unified Governance, social orchestration
  - Member commitment and shared ownership of goals
  - Transparency of business practices
  - Trust
  - Timely shared quality information
  - Shared successes and benefits
Service Orientation
Business Process level

- **Differentiation**
  - Decomposition of goals and vision to business requirements
  - Identify Key Drivers/high level goals decomposition
  - Decomposition of processes to technical level - BPMN
  - Normalization of Processes, Roles and Resources

- **Evolution**
  - Change through mutations and symbiogenesis (acquisitions)
  - Address maturity levels
  - Evaluate through simulation - BPEL
  - Promote best of breed, Reference Models
  - Benefits Realization Metrics, value chain optimization

- **Integration**
  - BP Composition
  - Policies and Procedures
  - Shared Semantic, Standards at Technical and above
  - Tanning and access
Service Orientation IT Layer

- **Differentiation**
  - Technical decomposition
  - Normalization of components and services
  - Virtualization, wrapping/packaging

- **Evolution**
  - Performance monitoring (metrics)
  - Promotion of best of breed
  - Change, renewal and retirement
  - Maintenance of standards

- **Integration**
  - Adherence to standards
  - Interfaces, Data Models, Policies, Contracts
  - ESBs, Semantic translators
  - Integration technologies (WS...)
  - Virtualization, Sharing of infrastructures
Organization, Business and IT collaboration

Vision -> Goals -> Business Metrics -> IT Metrics -> Market Attributes

Stakeholder compositions of the BP

Generic Business Reference Models

Business Services layer – 50-120 components

Standards driven Technical Decomposition to 1000+ (HL7, HITSP, HSSP, OMG, ANSI, CHI, IHI)

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Components, Service Packages, Applications
CASE STUDY: AMBULATORY CARE DECOMPOSITION

STAKEHOLDER VIEW

ORG GOALS

Access
Quality
Sustainability

Strategic
Generic 5+/\- 2
Business Level (50-120)

TECHNICAL

BUSINESS REFERENCE MODEL

SERVICE

Reference Management Service
Clinical Triage Service
Scheduling Service
Order Management Service
DI Service
LAB Service
Care Delivery Service
Discharge and Transfer Service
Forgotten Service

Registries

Person Registry
Provider Registry
Health Services Program Registry
Location Registry
Resources Registry
Drug Information Registry
Form Management Service
Case Management Services
Code Set Management Service

Services

Admission and Registration Service
Encounter Management Service
Clinical Information Service
Data Warehouse Service
EHR Service
Enterprise Content Management
SHR Service
Dashboard Service
Clinical Assessment Service
Reporting and Communication Service
Waitlist Service

Governance Service
Financial Services
Terminology Directory
Guideline Repository

Business Process Services
1000+/\- 200 – HL7 level
Conclusion

• SURVIVAL FEATURES: Efficiency and Agility
• PATTERN: Service Orientation
• ACTION: Implement 3D SOA
• CHANGE: Evolutionary, Nyquist rate
• TIMEFRAME: Now
Q&A

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