

KAOS- β : A Goal-Oriented Process Model for EIS

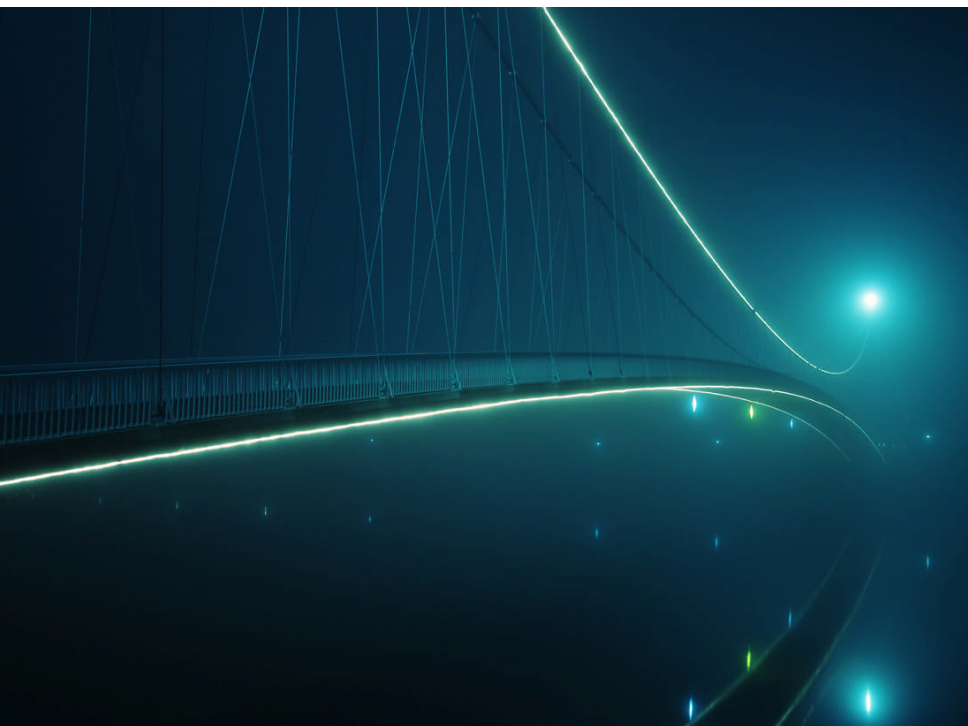
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Outline

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National Health System (NHS)

- A software system that was expected to be implemented in 10 years
- Budget: £12.7 bn
 - 8 years have passed
 - Only 13 out of 169 acute trusts received full system
 - Budget spent: £6.1 bn
 - Sample difficulties: 2008-2009
thousands of patient records were lost



[Bowers.S 2010, "Where the NHS's software scheme went wrong"]

NHS Goals

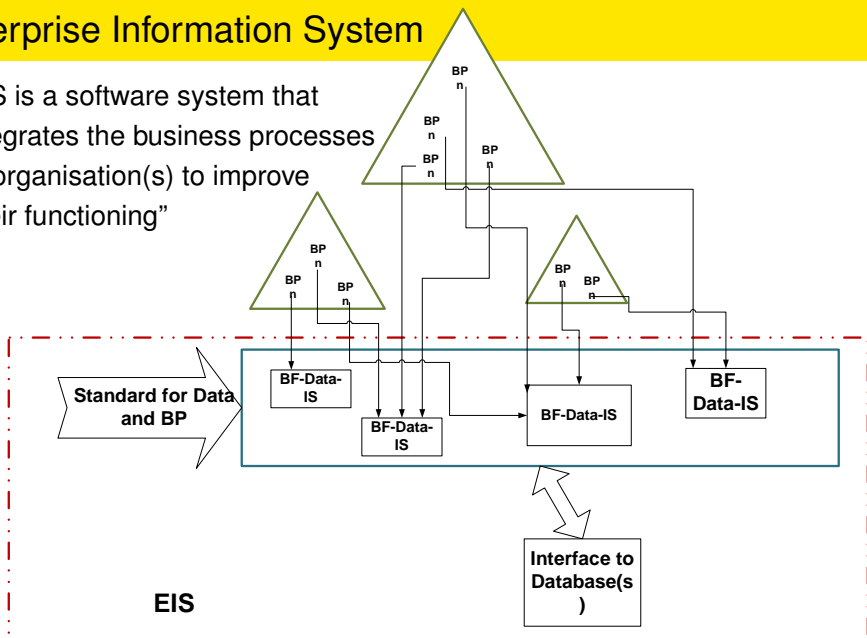
- Social View: “A safer place for patients”
- Political View: “provide visible evidence of NHS modernisation to patients and the public”
- Technical View: “revolutionise creaking paper-based patient record systems within the health service”

[Bowers.S 2010, “Where the NHS’s software scheme went wrong”]

[HC 831 2010, “A safer place for patients: learning to improve patient safety”]

Enterprise Information System

“EIS is a software system that integrates the business processes of organisation(s) to improve their functioning”



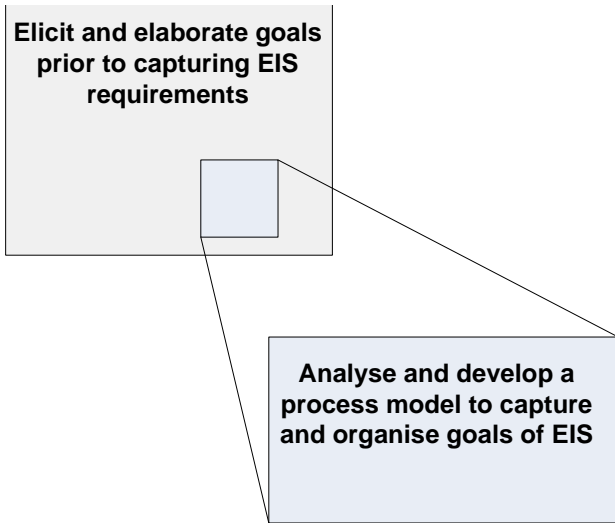
EIS

[Tabatabaie et al. 2008, “Exploring the boundaries of Enterprise Information Systems”]

Challenges of EIS

- Lack of clear links between EIS and the organisation's key priorities;
- Lack of agreed measures of success;
- Lack of effective engagement with stakeholders;
- Lack of understanding and contact with the supply industry at senior levels in the organisation;
- **Lack of ability to visualise complex software systems.**

Research Goals



Approach to Developing KAOS- β for EIS

- Look for and analyse goal-oriented techniques
- Modify the chosen one(s) as needed using example of EIS
- Analyse the results
- Tailor the approach
- Iterate

Inspired by evolutionary software development technique

[Sommerville 2007, "Software Engineering 8"]

Selected Goal-Oriented Approaches

- **GSN:** Goal-based argument
- **i^* :** To understand why a business process is the way it is rather than just to describe the requirements of a business process
- **GBRAM:** Goal-based requirement analysis methodology (identify, elaborate, refine, and organise goals)
- **KAOS:** Goal-based requirement engineering methodology

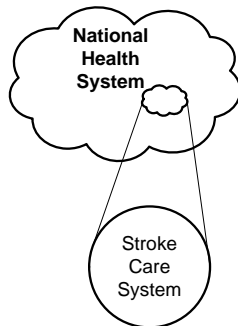
[Tabatabaie et al. 2010, "Evaluating Goal-Oriented Analysis in the Domain of Enterprise Information Systems"]

Why KAOS?

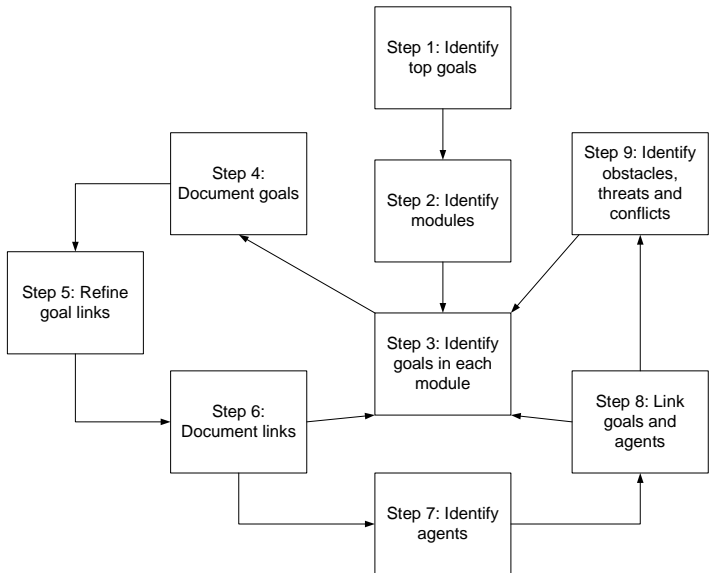
- Goal-based requirement engineering
- Well-documented & Tool support
 - More complete than GBRAM
- Top-down and bottom-up approaches to identifying and refining goals
- Appropriate level of detail for EIS
 - i^* requires too much detail information
- Unlike GSN, KAOS focuses on notation and heuristics
- Challenge: **No clear process** for non-KAOS experts even though it is claimed that it is used in various industrial cases.

Stroke Care Example

- A stroke is an earthquake in the brain.
- 3rd largest (11%) cause of death in England
- Stroke care system: management of medical procedure related to stroke within organisations such as NHS in UK.
- Stroke care system is like a business process among many business processes of NHS



KAOS- β Process Model



KAOS Vs KAOS- β

KAOS Goal Model	KAOS- β
Primary Goal Identification	
KAOS approach	Adds understanding of GBRAM
Implicit iteration	Explicit iteration
Goal categories (behaviour, soft goals)	No categories
No modularity	Adds modularity from GSN
Goal Documentation	
Fit criterion	No fit criterion
No context	Context (from GSN)
No notes	Notes (flexibility)
KAOS notation	Same

KAOS Vs KAOS- β (cont)

KAOS Goal Model	KAOS- β
Refinement Documentation	
Tactics describe the refinement	Adds source in tactic (traceability)
Agent	
3 steps: detect agents + wishes + allocate agents to goals	2 steps: identify agents + allocate agents to goals
Categorise agents	Same categories
Sequence diagram to identify agents	Inappropriate in EIS level
One agent per goal	Several agents to several goals

KAOS vs KAOS- β (cont)

Checks	
Converse of achieved goals	No such categories
Confusing goals and operations	To be considered
Confusing and-or refinement	To be considered
Abstract goals until reaches system boundaries (check if agent is outside the boundaries)	To be considered
Avoid ambiguity in goal specification	Not here (It is in the checklist-evaluation to make process shorter and to the point)
Stopping rule: If agent is outside the boundaries	Continue until designer is confident to start the next phase

Evaluation Challenges

- No standard way to evaluate the results
- Not having the capacity to try it in many realistic situations
- Different aspects of evaluations (General process characteristics, internal validity, external validity)

Evaluation Results- external Validity

Seamlessness and smoothness of transition between phases, stages and activities	√
Basis in the requirements	√
Testability and Tangibility of artefacts, and traceability to requirements	√
Encouragement of active user involvement	√
Practicability and practicality	(√)
Manageability of complexity	√
Extensibility / Configurability / Flexibility / Scalability	√
Application scope (Information Systems)	√

[Ramsin 2006, "The Engineering of an Object-Oriented Software Development Methodology"]

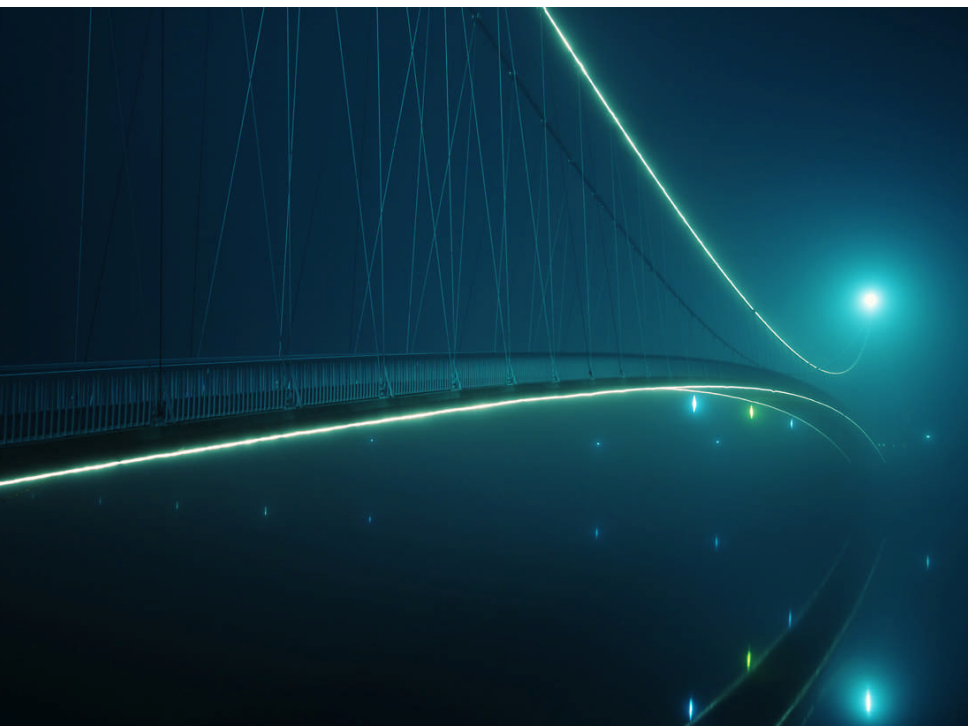
General Validity

<http://www-users.cs.york.ac.uk/~malihetb/>

The screenshot displays the Kestrel web application interface. At the top, the word "Kestrel" is prominently displayed in a stylized font, with a "Feedback" link to its right. Below the header, a navigation sidebar on the left lists various menu items, including "Introduction", "Stakeholder", "Tasks", "Activity Diagram", and "Roadmap". The main content area features a "Welcome" message with a microphone icon, followed by a "Main Description" section. This section includes a bird icon and the text "Welcome to KAOS-Beta Process Model Web Site". At the bottom of the main content area, five icons represent different components: "Introduction" (a green play button), "Tasks" (a blue document icon), "Roles" (a yellow figure icon), "Activity Diagram" (a blue document icon), and "Roadmap" (a yellow diamond icon with a blue arrow).

Future Work (cont)

- General process characteristics in Eclipse Process Framework (EPF)
- Link the results of goals to architecture (ongoing)
- Apply KAOS- β in other EIS examples (ongoing)



Process Model Vs Process

Process model is abstract, it does not cover the requirements for resources and time and all of the detail implementation of process.