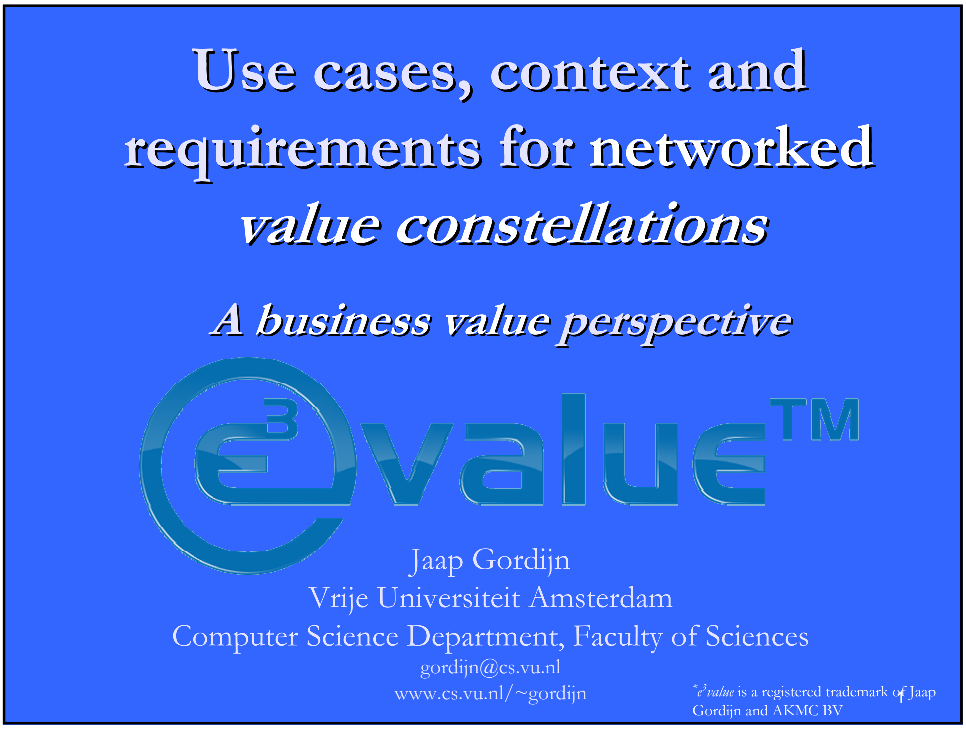

Use cases, context and requirements for networked *value constellations*

A business value perspective

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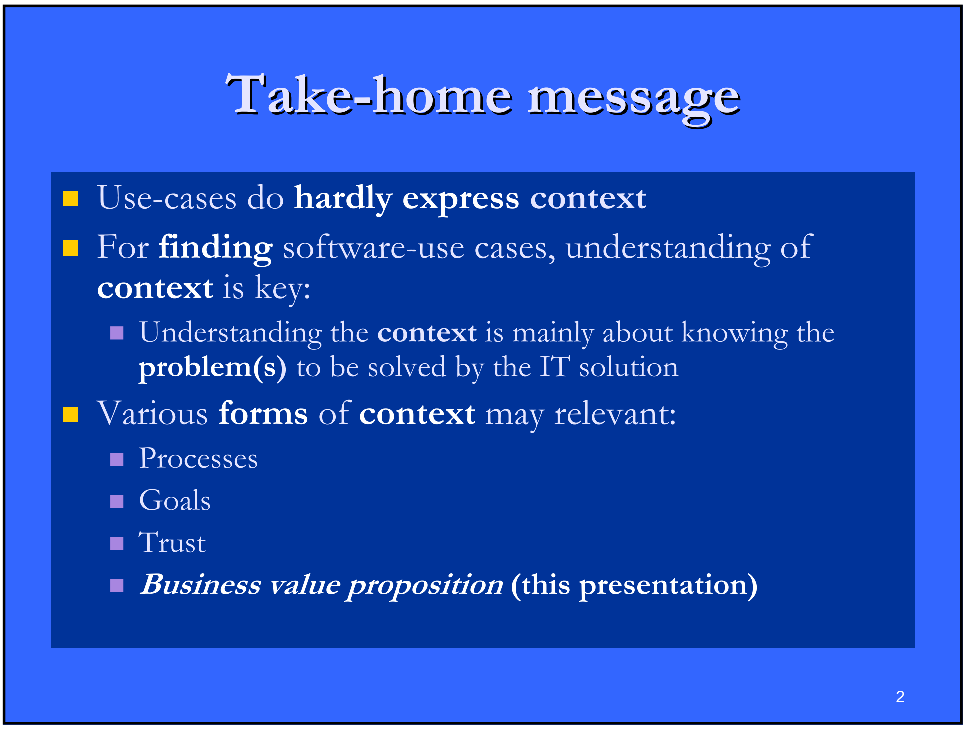
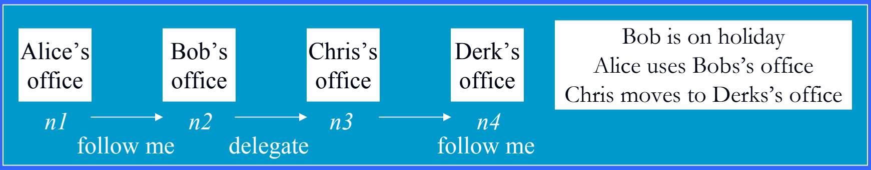


Take-home message

- Use-cases do **hardly express context**
- For **finding** software-use cases, understanding of **context** is key:
  - Understanding the **context** is mainly about knowing the **problem(s)** to be solved by the IT solution
- Various **forms** of **context** may relevant:
  - Processes
  - Goals
  - Trust
  - ***Business value proposition*** **(this presentation)**

Why a deeper understanding of the problem is needed: Call forwarding

- Consider **call-forwarding** (#21) on telephone switches
  - Forwarding incoming calls on number n1 to another number n2, or no forwarding at all
- Define the **requirement** and **use case**
  - The **user** must be able to **enter** number n2 for number n1 (using some form of authentication) to the **computer** (PBX), or to **reset** forwarding for number n1
- What happens if n2 is forwarded to n3? **Should call forwarding be transitive**?
- Deeper analysis of the **problem domain** shows that there is a difference between:
  - **Follow me**: user wants that the number follows him. Should end the chain
  - **Delegate**: user wants that the number directs to a secretary. Can continue the chain (delegated responsibilities can be delegated again)



Alice's office

Bob's office

Chris's office

Derk's office

n1 → *n2* → *n3* → *n4*

follow me

delegate

follow me

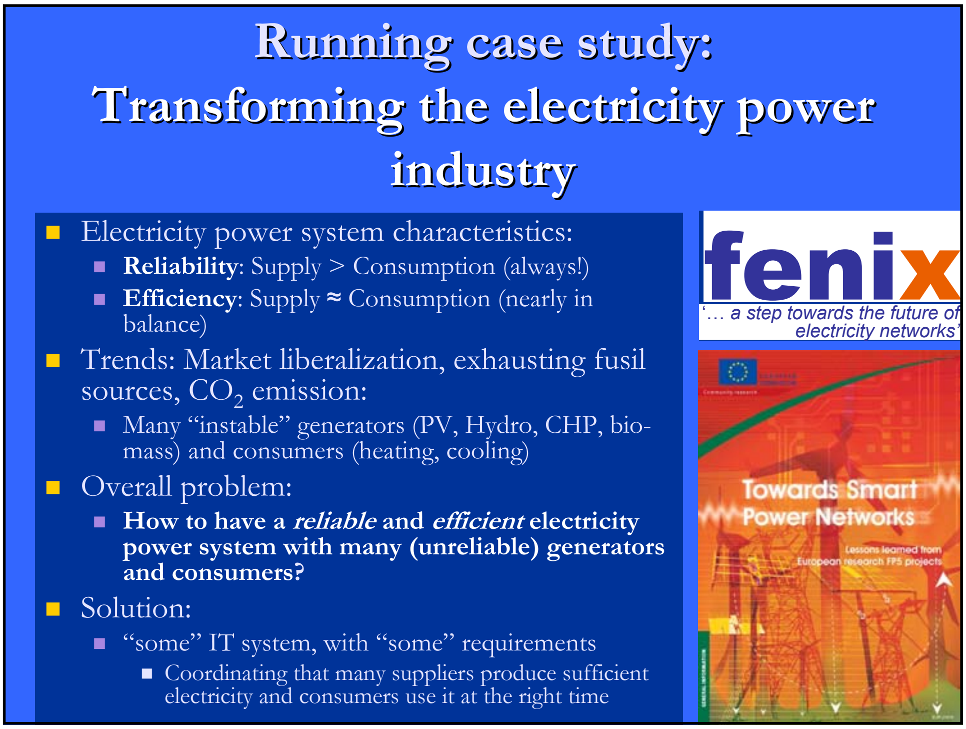
Bob is on holiday
Alice uses Bobs's office
Chris moves to Derks's office

The answer is not in the interaction between system and user, but is found in the context (e.g. the processes in the world of the user)

Source: "Problem Frames" by Michael Jackson

Not understanding the problem is expensive!

- Approx **40≈60%** of all **defects** found in a software project can be traced back to the **requirements stage** (source: Leffingwell, "Calculating the ROI from more Effective Requirements Managemt, American Programmer 10(4) 1997")
- **Requirement errors** cause **70≈85%** of all software revisions (source: also Leffingwell)
- Fixing a **requirement error** discovered **after** putting the system into operations costs **68 times** as much as correcting the error **during** the requirements engineering phase (source: Boehm, "Software Engineering Economics", 1981)
- And this is only repairing and fixing. Think about the **real** costs …



Running case study: Transforming the electricity power industry

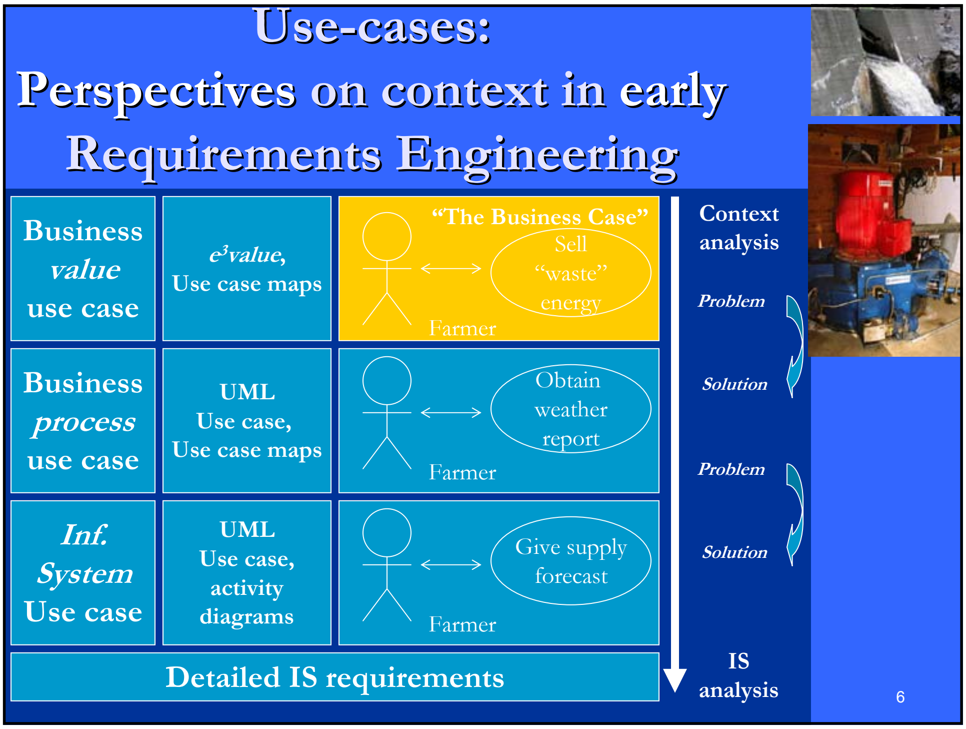
- Electricity power system characteristics:
  - **Reliability**: Supply > Consumption (always!)
  - **Efficiency**: Supply ≈ Consumption (nearly in balance)
- Trends: Market liberalization, exhausting fusil sources, CO_2 emission:
  - Many "instable" generators (PV, Hydro, CHP, bio-mass) and consumers (heating, cooling)
- Overall problem:
  - **How to have a *reliable* and *efficient* electricity power system with many (unreliable) generators and consumers?**
- Solution:
  - "some" IT system, with "some" requirements
    - Coordinating that many suppliers produce sufficient electricity and consumers use it at the right time

fenix

'… a step towards the future of electricity networks'

Towards Smart Power Networks

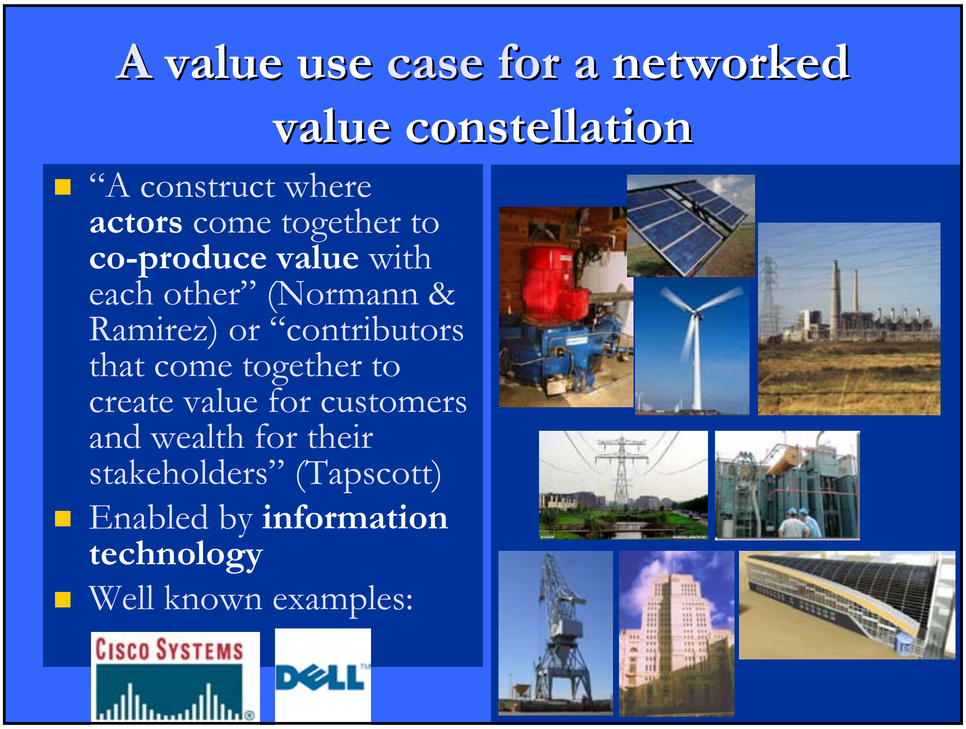
Lessons learned from European research FP5 projects



Use-cases: Perspectives on context in early Requirements Engineering

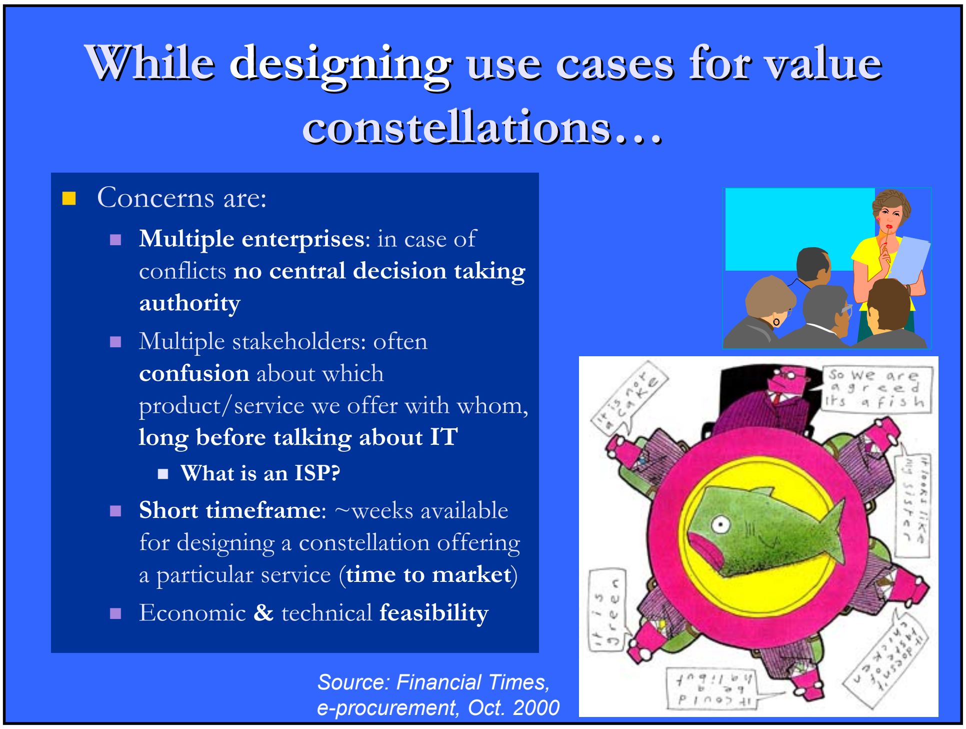
Business *value* use case	***e^3value*, Use case maps**	**"The Business Case"** Farmer ⟷ Sell "waste" energy
Business *process* use case	**UML Use case, Use case maps**	Farmer ⟷ Obtain weather report
***Inf. System* Use case**	**UML Use case, activity diagrams**	Farmer ⟷ Give supply forecast

Detailed IS requirements



A value use case for a networked value constellation

- “A construct where **actors** come together to **co-produce value** with each other” (Normann & Ramirez) or “contributors that come together to create value for customers and wealth for their stakeholders” (Tapscott)
- Enabled by **information technology**
- Well known examples:



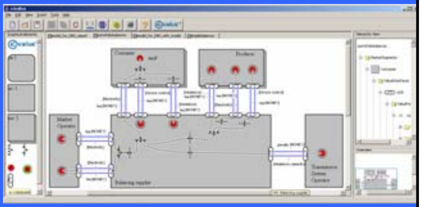
While designing use cases for value constellations…

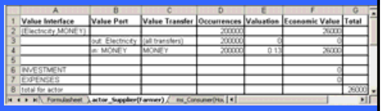
- Concerns are:
  - **Multiple enterprises**: in case of conflicts **no central decision taking authority**
  - Multiple stakeholders: often **confusion** about which product/service we offer with whom, **long before talking about IT**
    - **What is an ISP?**
  - **Short timeframe**: ~weeks available for designing a constellation offering a particular service (**time to market**)
  - Economic **&** technical **feasibility**

Source: Financial Times, e-procurement, Oct. 2000

A conceptual, lightweight model of the value constellation is needed …

- Representing a **precise** and **shared understanding** of the value constellation
- Allowing **easy communication** (graphical)
- Allowing for **checking** common **business rules** facilitating **executive decision making**:
  - Profitability, "one good turn deserves another"
- Being sufficiently **lightweight**
- Being a **starting point** for Information **Systems development**: e.g. for assessing technical feasibility





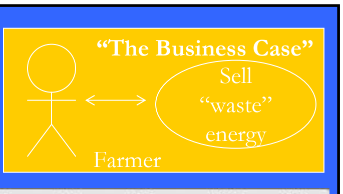
	A	B	C	D	E	F	G
1	**Value Interface**	**Value Port**	**Value Transfer**	**Occurrences**	**Valuation**	**Economic Value**	**Total**
2	(Electricity,MONEY)			200000		26000	
3		out: Electricity	(all transfers)	200000	0	0	
4		in: MONEY	MONEY	200000	0.13	26000	
5							
6	INVESTMENT					0	
7	EXPENSES					0	
8	total for actor						26000

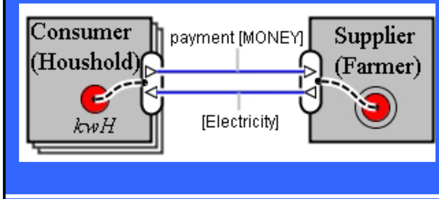
Formulasheet
actor_Supplier(Farmer)
ms_Consumer(Ho

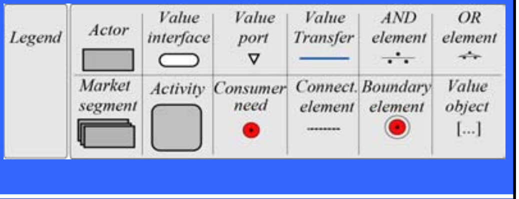
A value use case says something about …

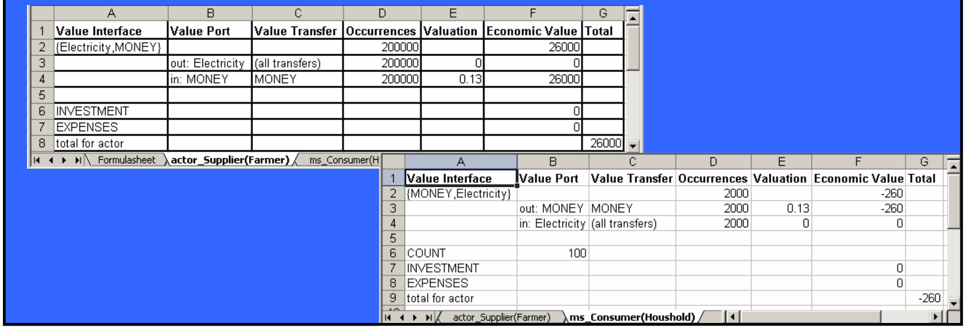
- Who are the **actors** (enterprises and final customers) involved?
- What do they **transfer of economic value** to each other, and what do they request **in return** for that?
- Why do they transfer these values? To satisfy a **need**
- What **activities** do they perform to produce/consume?
- A **value** use case ≠ business **process** use case:
  - No **time-ordering** in a value use case
  - Actors are of a different kind
  - Only transfers that represent **direct economic value** in a value use case

A first value use case in e^3value









	A	B	C	D	E	F	G
1	**Value Interface**	**Value Port**	**Value Transfer**	**Occurrences**	**Valuation**	**Economic Value**	**Total**
2	{Electricity,MONEY}			200000		26000	
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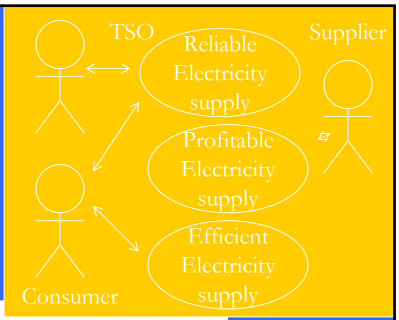
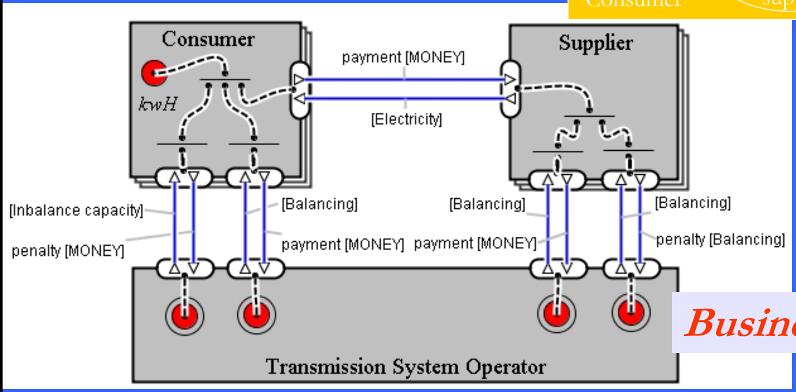
4		in: MONEY	MONEY	200000	0.13	26000	
5							
6	INVESTMENT					0	
7	EXPENSES					0	
8	total for actor						26000

	A	B	C	D	E	F	G
1	**Value Interface**	**Value Port**	**Value Transfer**	**Occurrences**	**Valuation**	**Economic Value**	**Total**
2	{MONEY,Electricity}			2000		-260	
3		out: MONEY	MONEY	2000	0.13	-260	
4		in: Electricity	(all transfers)	2000	0	0	
5							
6	COUNT	100					
7	INVESTMENT					0	
8	EXPENSES					0	
9	total for actor						-260

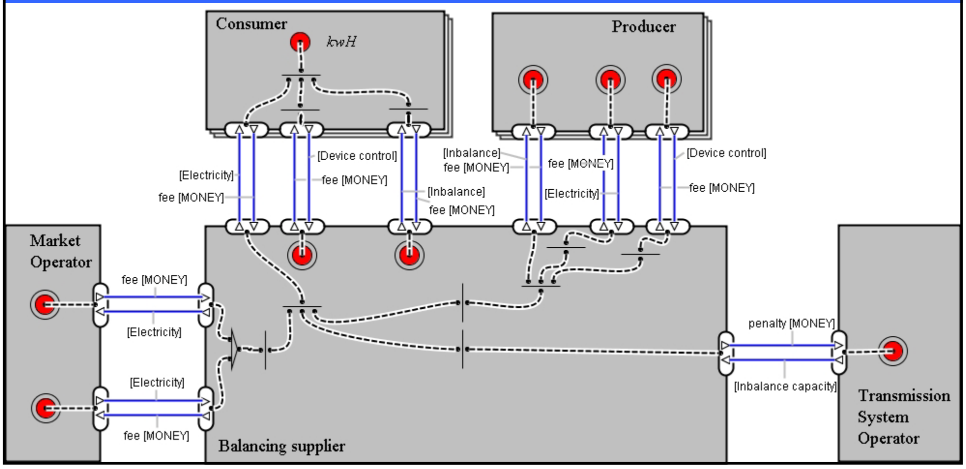
Case study: Balancing electricity supply and consumption

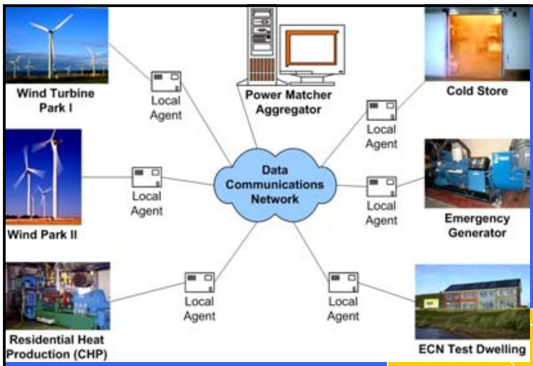

TSO
Supplier
Consumer
Reliable Electricity supply
Profitable Electricity supply
Efficient Electricity supply



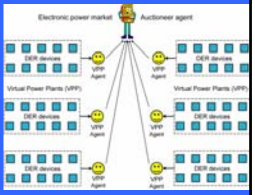
Business case?

Case study: Portfolio-based balancing of electricity supply and consumption

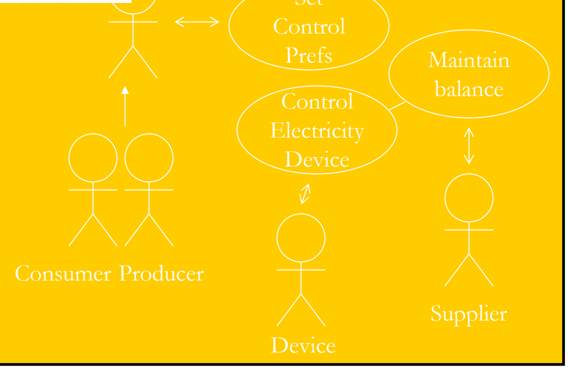




Bringing in IT



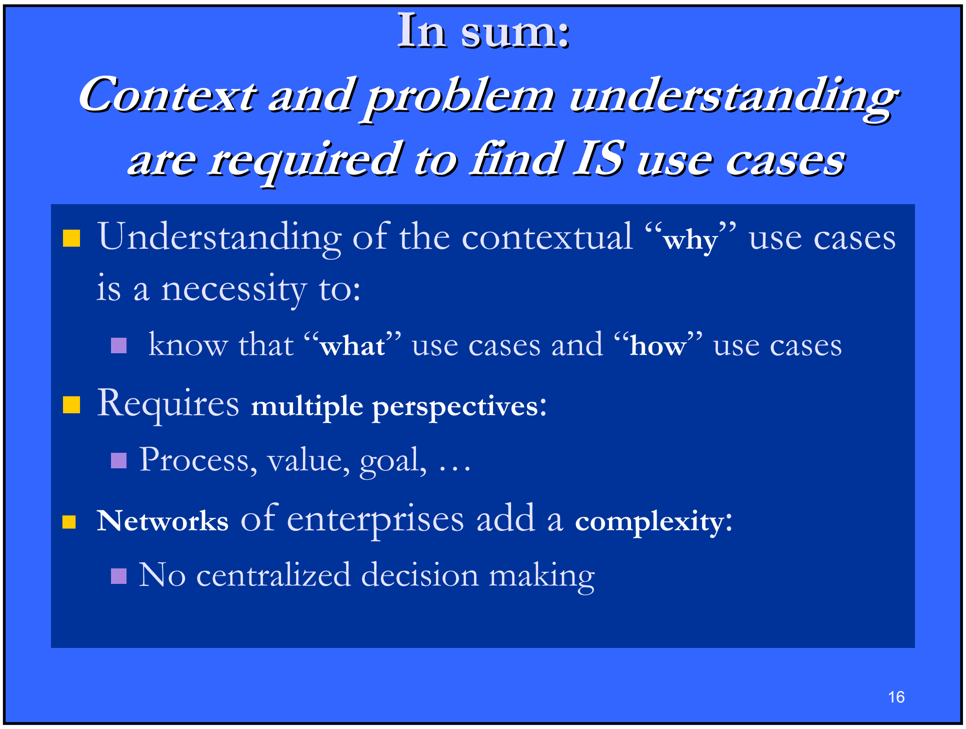
- Automatic **imbalance reduction in real time**
- Result > **40% imbalance reduction**
  - Commercialization underway



The RE research agenda: A focus on requirements as problems

- **Value** modeling
  - *e³value*
- **Goal** modeling
  - *I**, Tropos, KAOS
- **Problem framing**
  - Jackson's problem frames
- **Shared aim**: Understanding the **context** of information systems

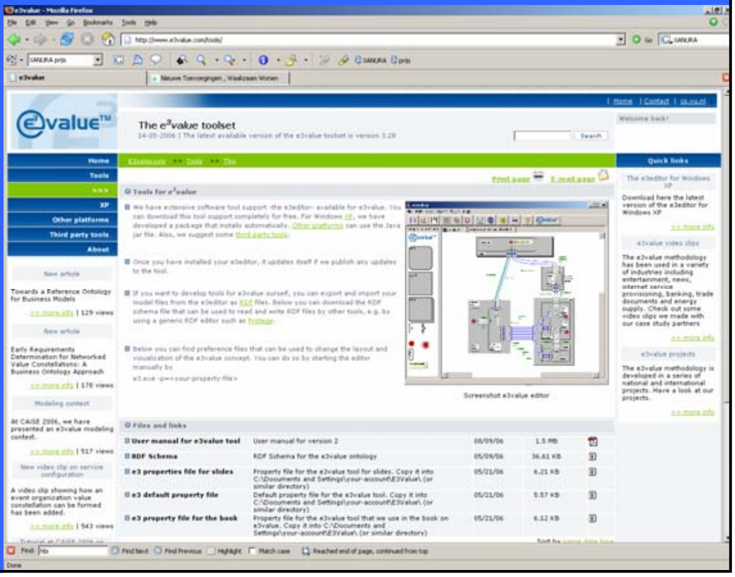
2006 RE
14th IEEE International Requirements Engineering Conference
Minneapolis/St. Paul, Minnesota, USA
September 11-15, 2006
CAiSE'07
Trondheim, Norway
e3
PROBLEM FRAMES
Analyzing and structuring software development problems
Michael Jackson
Requirements Engineering



In sum: *Context and problem understanding are required to find IS use cases*

- Understanding of the contextual "**why**" use cases is a necessity to:
  - know that "**what**" use cases and "**how**" use cases
- Requires **multiple perspectives**:
  - Process, value, goal, …
- **Networks** of enterprises add a **complexity**:
  - No centralized decision making

Free tool support for e^3*value* and *further information*: www.e3value.com



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The e^3value toolset

14-05-2006 | The latest available version of the e3value toolset is version 3.28

Tools for e^3value

- We have extensive software tool support -the e3editor- available for e3value. You can download this tool support completely for free. For Windows XP, we have developed a package that installs automatically. Other platforms can use the Java jar file. Also, we suggest some third party tools.
- Once you have installed your e3editor, it updates itself if we publish any updates to the tool.
- If you want to develop tools for e3value ourself, you can export and import your model files from the e3editor as RDF files. Below you can download the RDF schema file that can be used to read and write RDF files by other tools, e.g. by using a generic RDF editor such as Protege.
- Below you can find preference files that can be used to change the layout and visualization of the e3value concept. You can do so by starting the editor manually by

```
e3.exe -p=<your-property-file>
```

Files and links

User manual for e3value tool	User manual for version 2	08/09/06	1.5 MB
RDF Schema	RDF Schema for the e3value ontology	05/09/06	36.61 KB
e3 properties file for slides	Property file for the e3value tool for slides. Copy it into C:\Documents and Settings\your-account\E3Value\ (or similar directory)	05/21/06	6.21 KB
e3 default property file	Default property file for the e3value tool. Copy it into C:\Documents and Settings\your-account\E3Value\ (or similar directory)	05/21/06	5.57 KB
e3 property file for the book	Property file for the e3value tool that we use in the book on e3value. Copy it into C:\Documents and Settings\your-account\E3Value\ (or similar directory)	05/21/06	6.12 KB

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New article

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At CAISE 2006, we have presented an e3value modeling contest.

>> more info | 517 views

New video clip on service configuration

A video clip showing how an event organization value constellation can be formed has been added.

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The e3editor for Windows XP

Download here the latest version of the e3editor for Windows XP

>> more info

e3value video clips

The e3value methodology has been used in a variety of industries including entertainment, news, internet service provisioning, banking, trade documents and energy supply. Check out some video clips we made with our case study partners

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e3value projects

The e3value methodology is developed in a series of national and international projects. Have a look at our projects.

>> more info

Intro's on e^3*value* (2)

- Jaap Gordijn, Eric Yu, Bas van der Raadt, "e-Service Design Using i* and *e3value* Modeling", IEEE Software, May/June 2006, pp. 26-33.
- J. Gordijn and J.M. Akkermans, "Value based requirements engineering: Exploring innovative e-commerce idea", Requirements Engineering Journal, Vol 8, Nr 2, pp. 114-134, 2003
- J. Gordijn and J.M. Akkermans, "e^3*value*: Design and Evaluation of e-Business Models", IEEE Intelligent Systems, special issue on e-business, Vol. 16, No. 4, pp. 11-17, 2001
- **Download: www.e3value.com/publications**