El valor añadido de los procesos de software y del software como servicio

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El valor de los procesos TIC en la cuenta de resultados

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ETSI Industriales-UPM (C/ José Gutiérrez Abascal, 2)

Patronos

Patrocina

Contenido

- Los procesos y las buenas prácticas en Ingeniería del Software
- Algunos tópicos o “leyendas urbanas” a tener en cuenta
- Modelos de evaluación de procesos software (el CMMI)
- Tendencias actuales en investigación
- La nueva concepción del software como servicio
- Del “Service computing” a la “Service Science” como nueva disciplina

¿Los procesos de la Ingeniería de Software, bien aplicados, inciden en la cuenta de resultados y en la reducción de costes?

- Algunas cuestiones previas...

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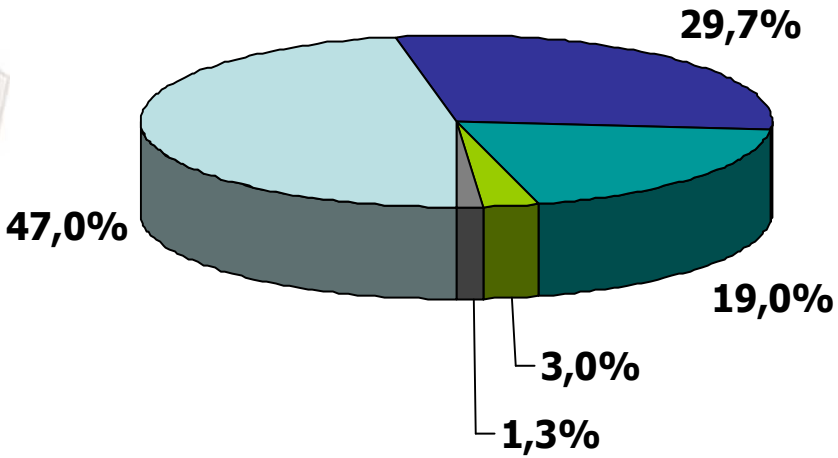
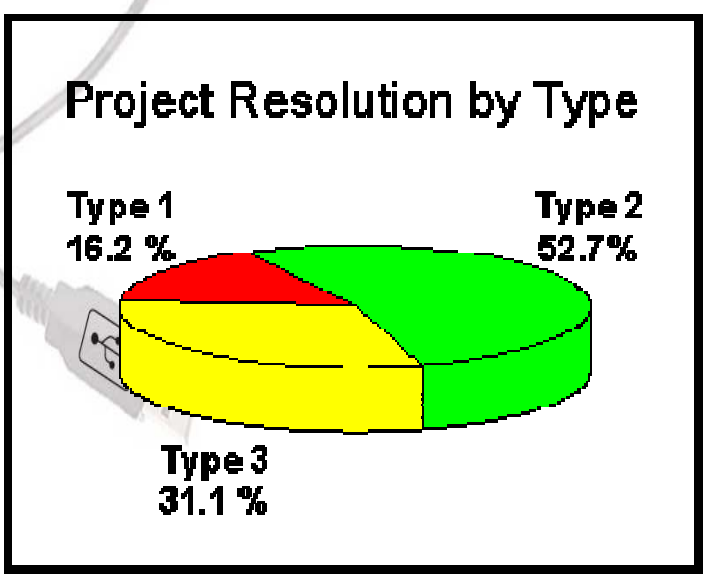
An accounting study from 1979



- Delivered but never used
- Paid but not delivered
- Used with big changes, abandoned
- Used with some changes
- Used as it was

Source: ***Government Accounting Office*. Software contracts by $ 6.8 mill.**

The Chaos Report from 1994…



Resolution Type 1, or project success:
The project is completed on-time and on-budget, with all features and functions as initially specified.

Resolution Type 2, or project challenged:
The project is completed and operational but over-budget, over the time estimate, and offers fewer features and functions than originally specified.

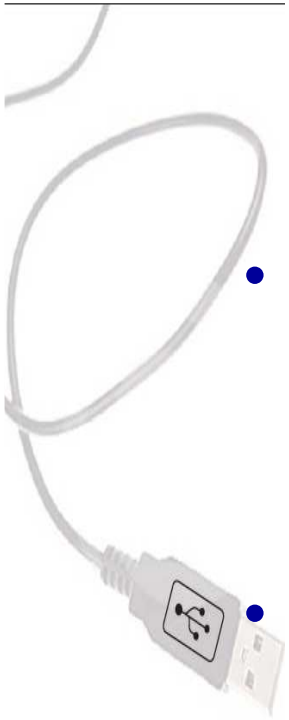
Resolution Type 3, or project impaired:
The project is canceled at some point during the development cycle.

Source: The Standish Group, http://www.standishgroup.com, Chaos Report
The respondents were IT executive managers. The sample included large, medium, and small companies across major industry segments, e.g., banking, securities, manufacturing, retail, wholesale, heath care, insurance, services, and local, state, and federal organizations. The total sample size was 365 respondents and represented 8,380 applications.

….Chaos report evolution

	1994	1996	1998	2000	2002	2004	2006	2009
Successful	16%	27%	26%	28%	34%	29%	35%	32%
Challenged	53%	33%	46%	49%	51%	53%	46%	44%
Failed	31%	40%	28%	23%	15%	18%	19%	24%

Source:
“The curious case of the CHAOS report”, Jorge Domínguez, projectsmart.co.uk



The Ariane launcher failure

- In 1996, the 1st test flight of the Ariane 5 rocket ended in disaster when the launcher went out of control 37 seconds after take off.
- The problem was due to a reused component from a previous version of the launcher (the Inertial Navigation System) that failed because assumptions made when that component was developed did not hold for Ariane 5.
- The functionality that failed in this component was not required in Ariane 5.

To Juan A. López, GTD

Las técnicas, herramientas y métodos

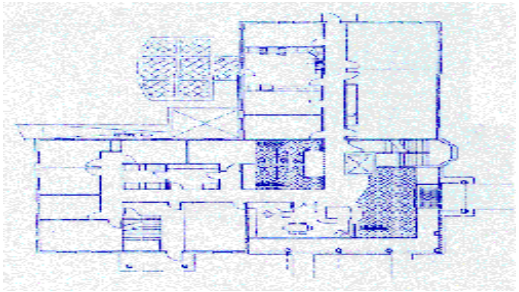
que usa un/a ingeniero/a

dependen de la complejidad

del artefacto que se diseña

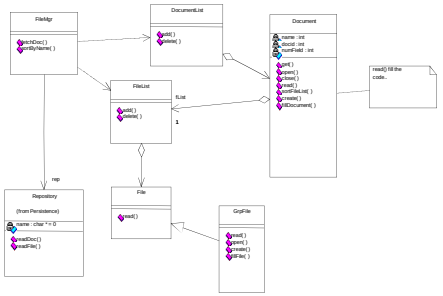
Modelling in Engineering

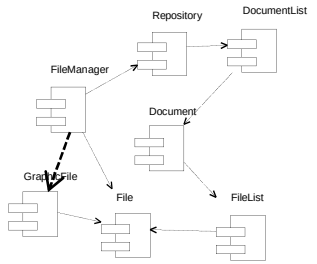
- Architecture/ Structural Engineering
  - Building Views

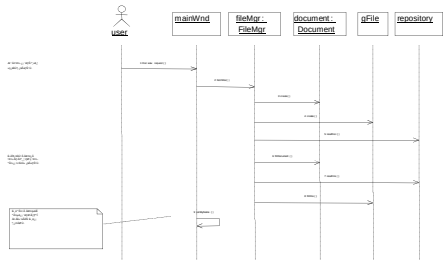


- Modelling Tools (ex.)
  - Autocad

- Software Engineering
  - Software System Views (UML diagrams, or others)







- Modelling Tools (ex)
  - RSM

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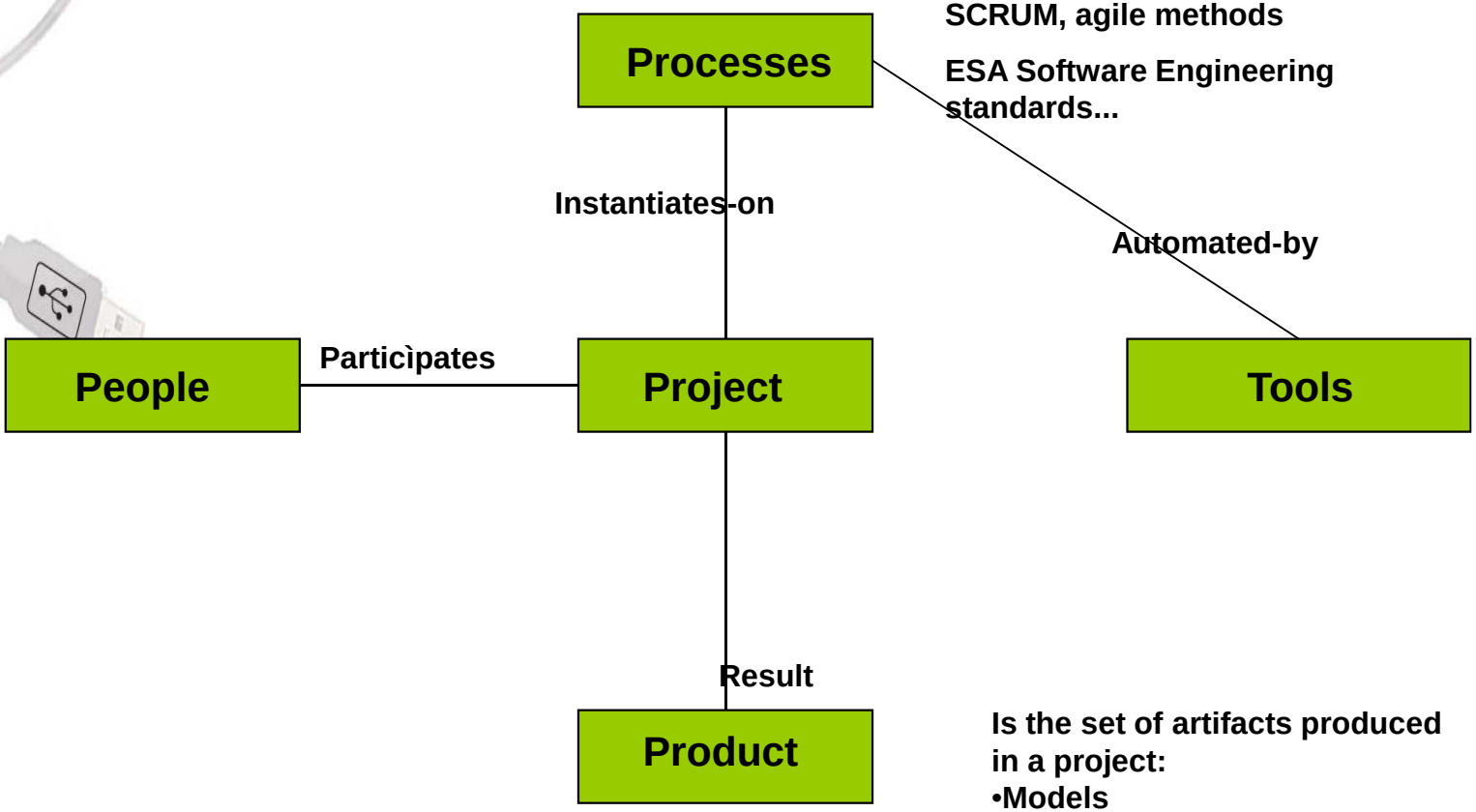
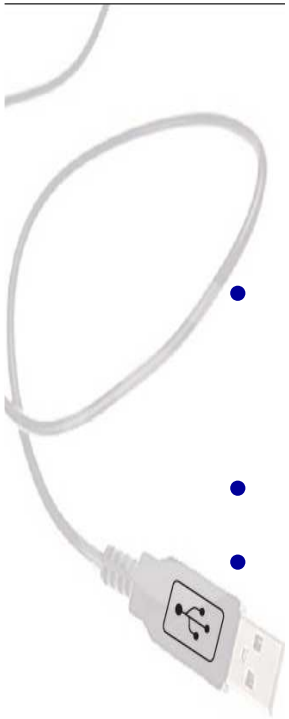
Las 4 P’s en el desarrollo de software



Is the set of artifacts produced in a project:
- **Models**
- **Source code**
- **Executable code**
- **Documents**

Definiciones

- Proceso: una secuencia de actividades ordenada que resulta en un producto o cambio de estado (define el qué y el como)
- Proyecto: una instanciación concreta u ocurrencia de un proceso (quien, cuando, con qué)
- Producto: el resultado del proyecto
- People: los participantes



Software as an engineering product

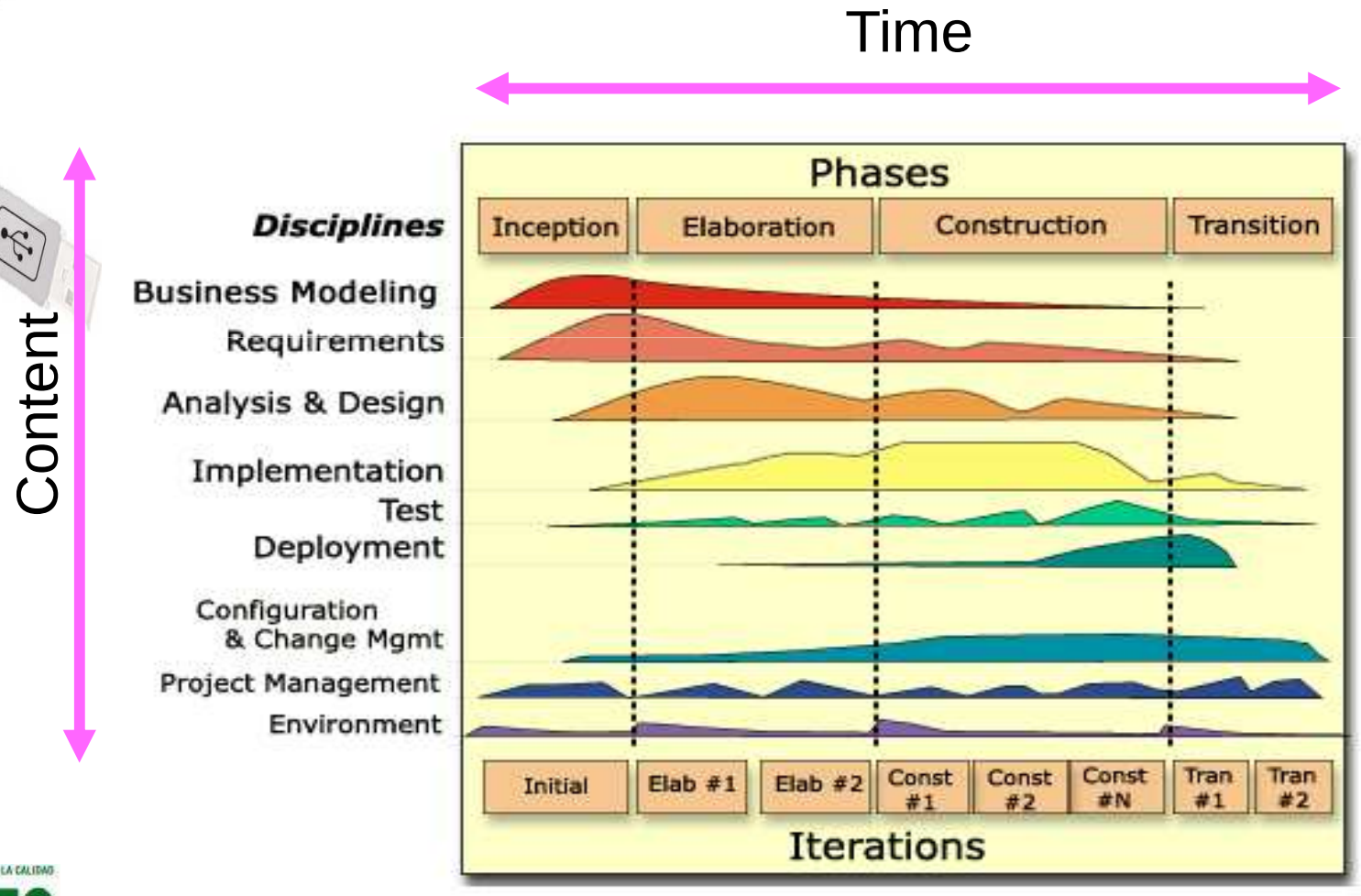
- The term “software engineering” was coined in two NATO conferences: 1968, 1969, with the idea of using the engineering paradigm in the software production
- From there to now, is an established discipline
- The Software Engineering Institute (http://www.sei.cmu.edu/) reports the benefits of using the recommended best practices in companies
- Also the European Software Institute (http://www.esi.es/) is doing the same in Europe
- In safety-critical applications, (medical applications, industrial control, space sector, etc.), the use of software engineering approaches is crucial
- Software engineering is the technical basis in the construction of Information Systems

Software Engineering

- Software engineering's object of study is, mainly, the process of transforming the initial user requirements in a software system
- Software engineering also deals with the methods, techniques and tools used to perform the activities of those processes
- **Software engineering is an engineering discipline that is concerned with all aspects of software production (from I. Sommerville)**

The Unified Process (IBM-RUP)*

- Content: Activities (disciplines) and workflows
- Time: phases and iterations



(*)IBM – RUP is an hipertext document included in the IBM-Rational suite (tool set)

The Iterative approaches

The picture comes from the Rational Unified Process, but all the present approaches to software process (the Spiral model, the prototyping approach, etc.) are based in this idea of progressive "growing" of the system.

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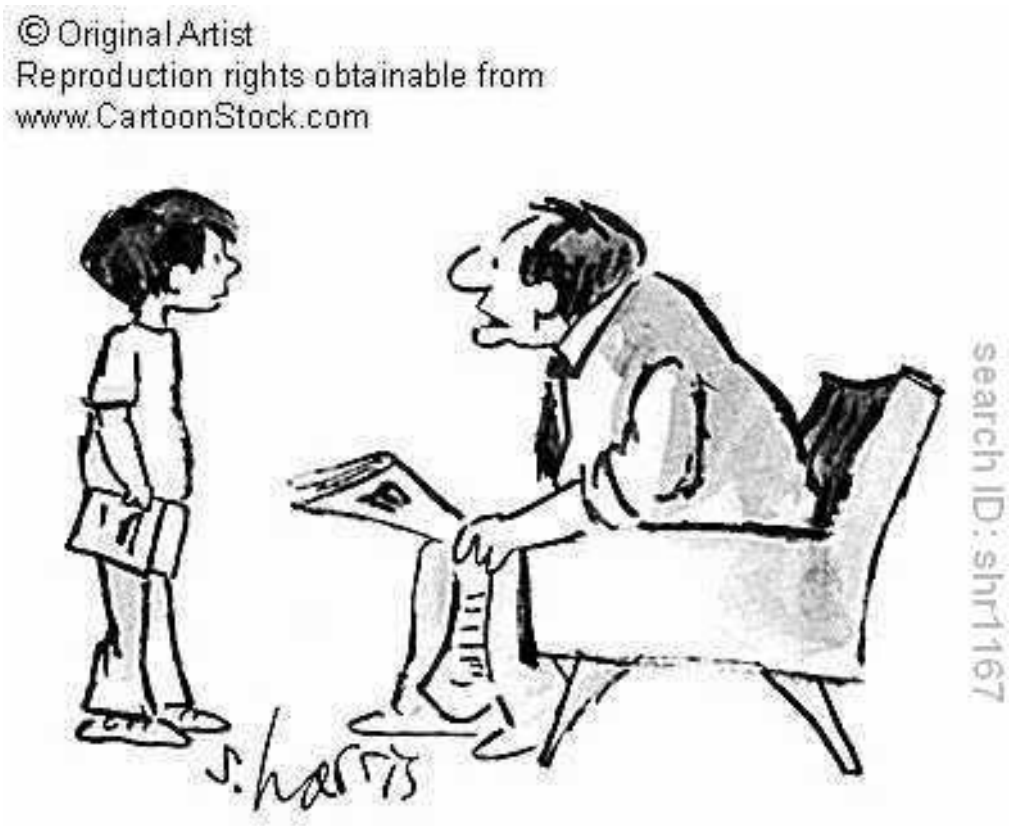
Los Ingenieros de Software son unos tipos locos que andan haciendo dibujitos que no sirven para nada

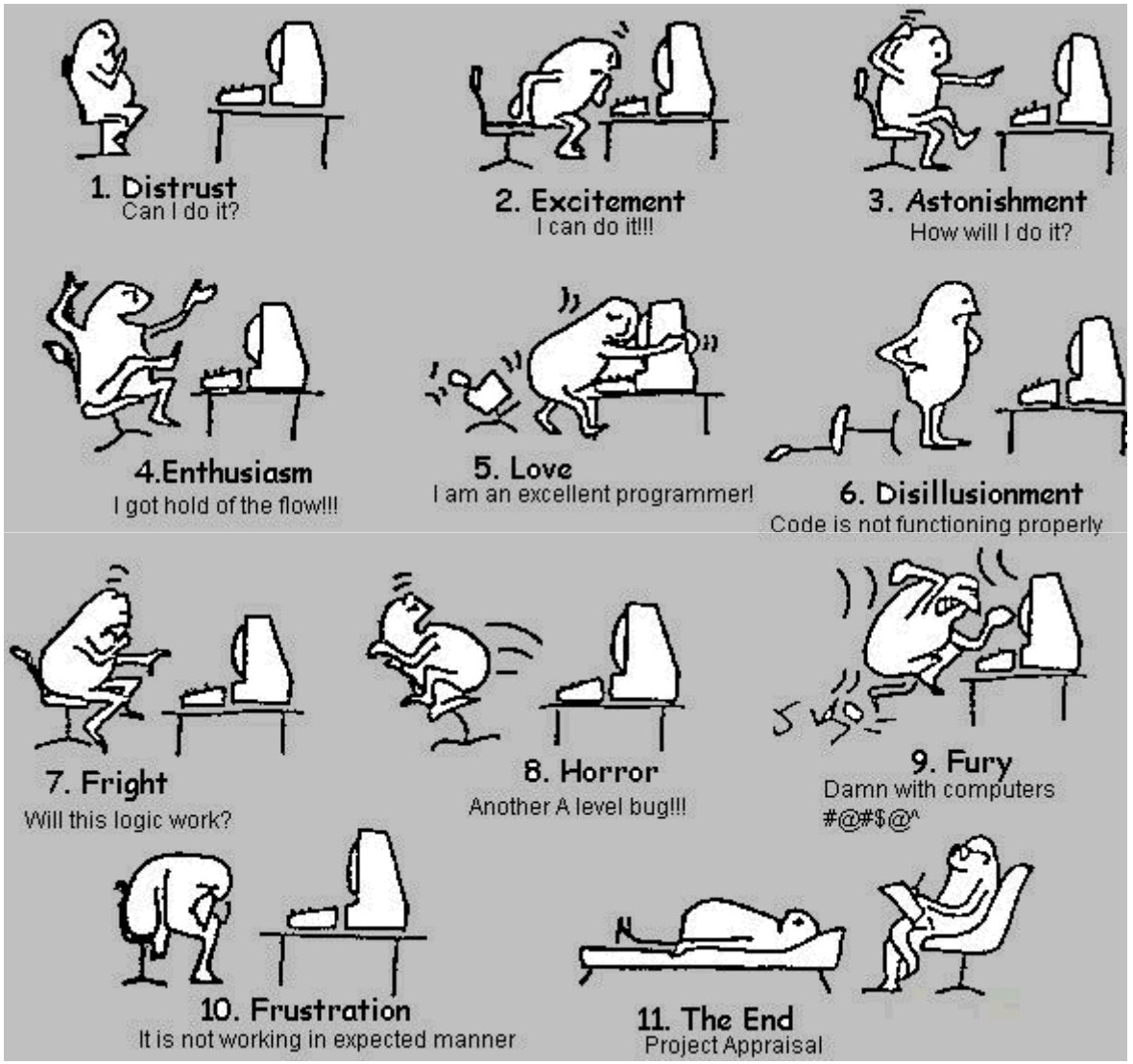
...Typical look on the average student when asked about software engineering ....

Es una profesión bien conocida

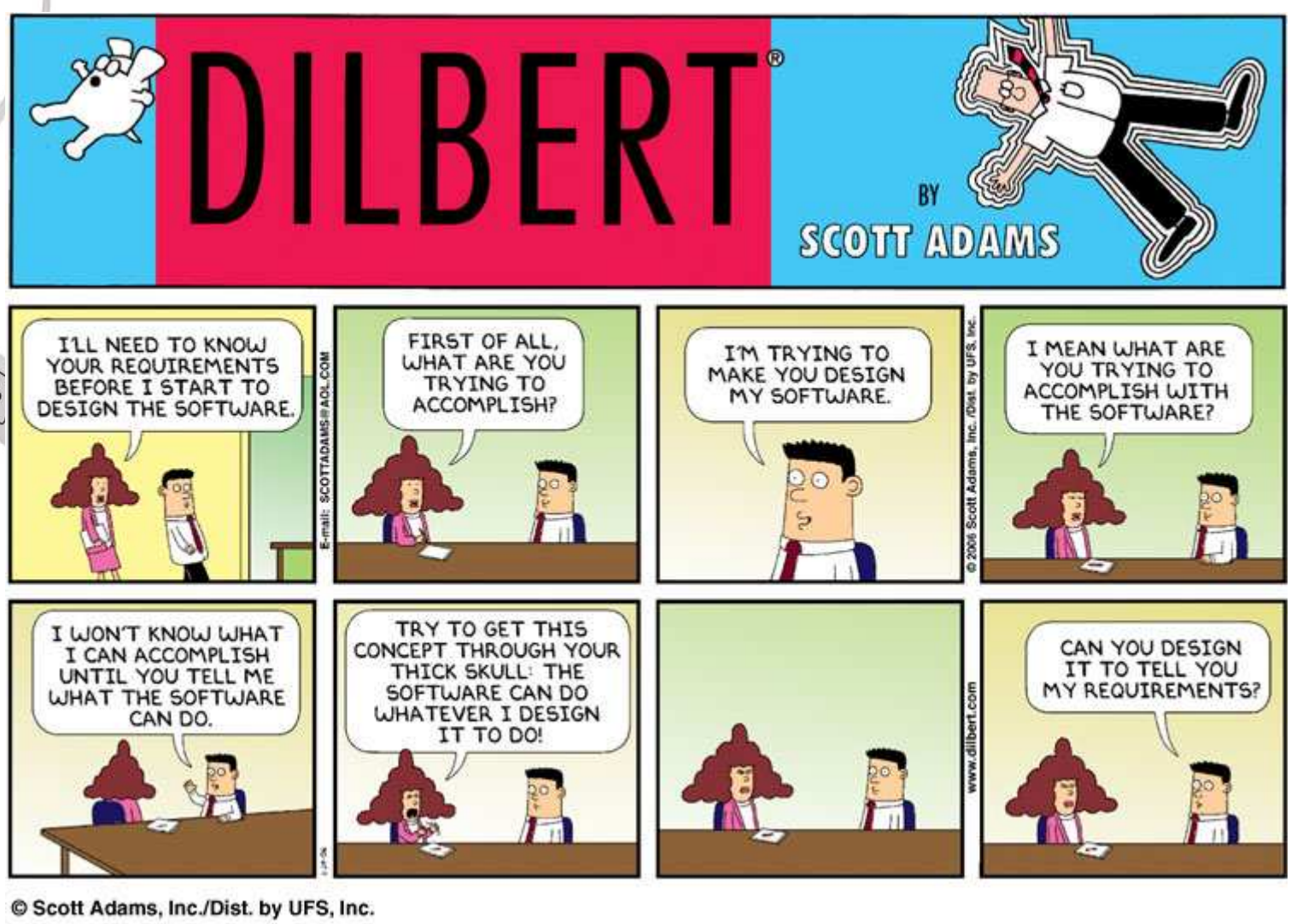


"Sure you can become a systems analyst if you want to—but tell Daddy, what *is* a systems analyst?"

La IdS consiste en programar…



¿Requisitos? Código!



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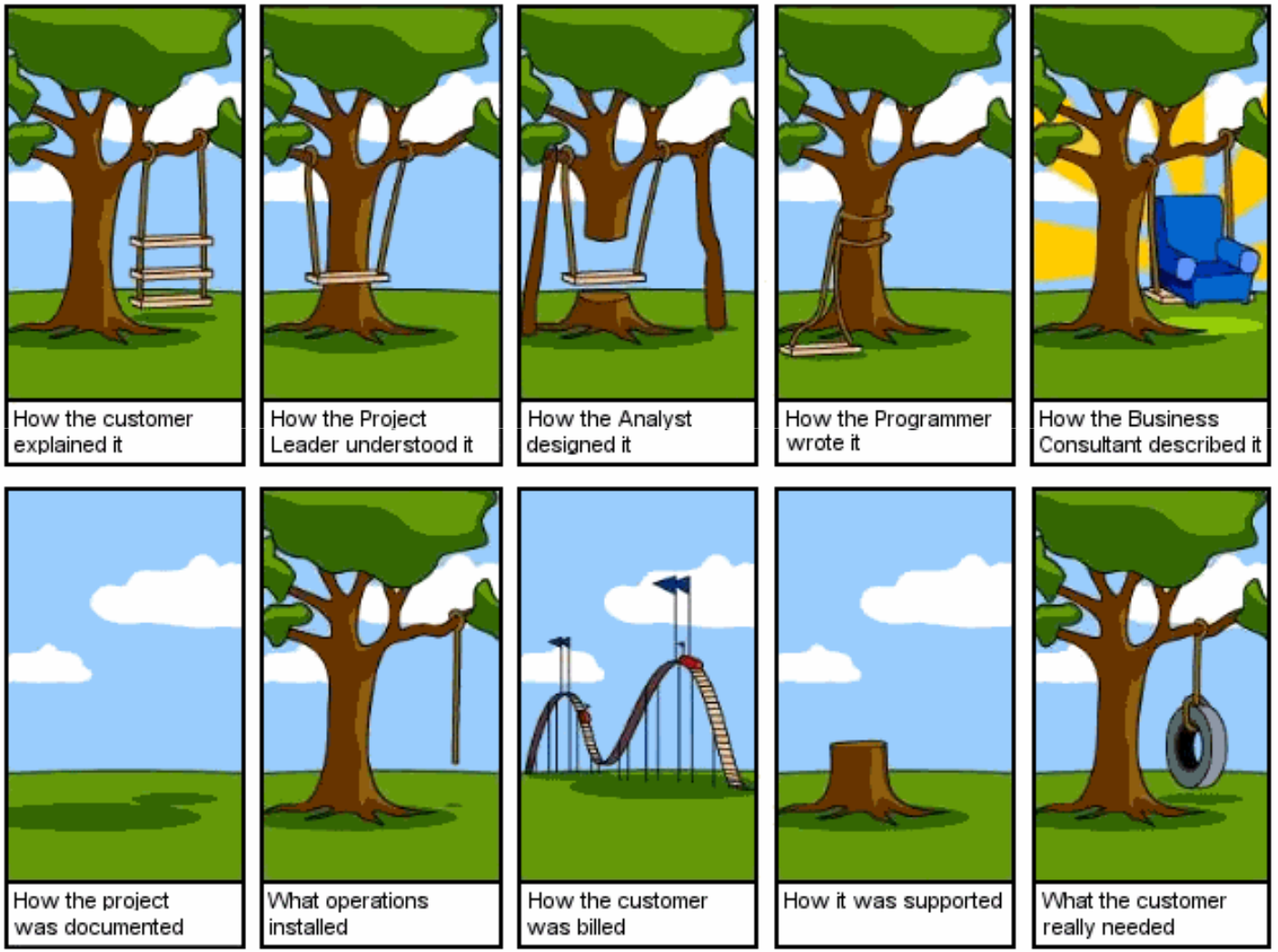
… y tratándose de programar, no tiene problema alguno.



La IdS (o asegurar la calidad) me va a salir muy cara…

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Overview

CMMI is a process improvement approach that provides organizations with the essential elements of effective processes that ultimately improve their performance. CMMI can be used to guide process improvement across a project, a division, or an entire organization. It helps integrate traditionally separate organizational functions, set process improvement goals and priorities, provide guidance for quality processes, and provide a point of reference for appraising current processes.

Spotlight on CMMI

CMMI Version 1.3—Plans for the Next Version

The CMMI Steering Group has approved criteria for the next release of the CMMI Product Suite. This column will describe the key ingredients and the plans for release of CMMI Version 1.3.

See more library items

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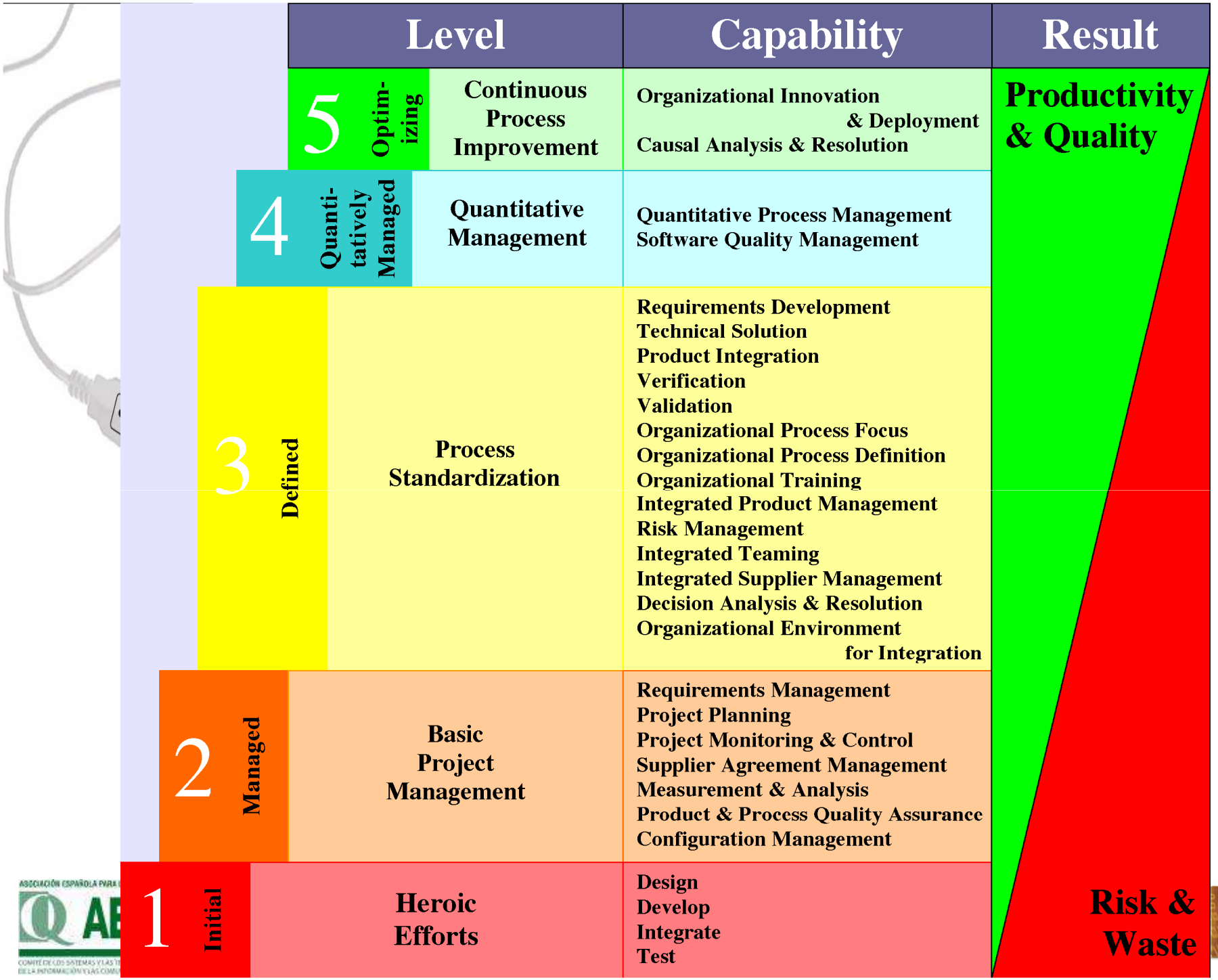
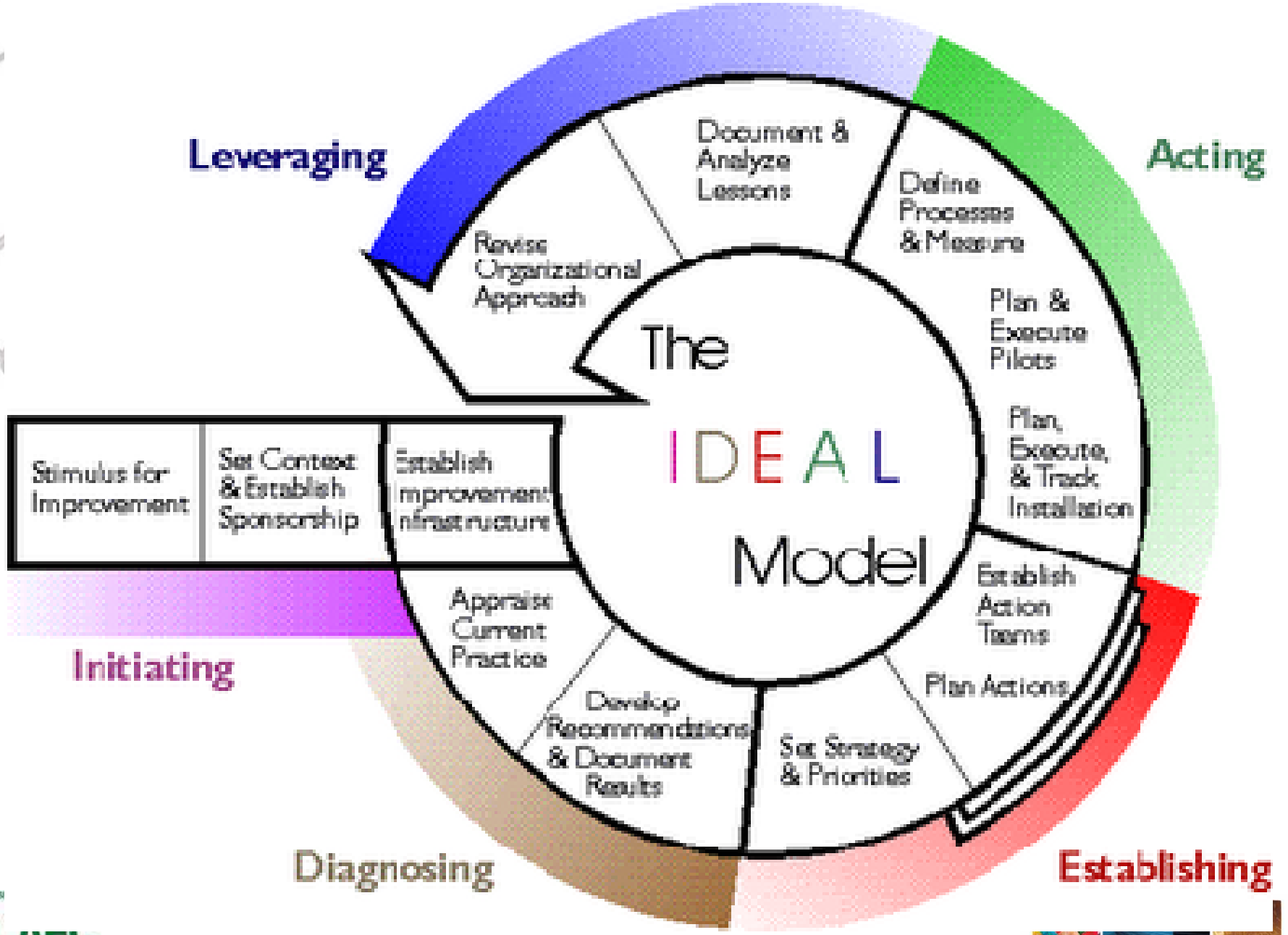
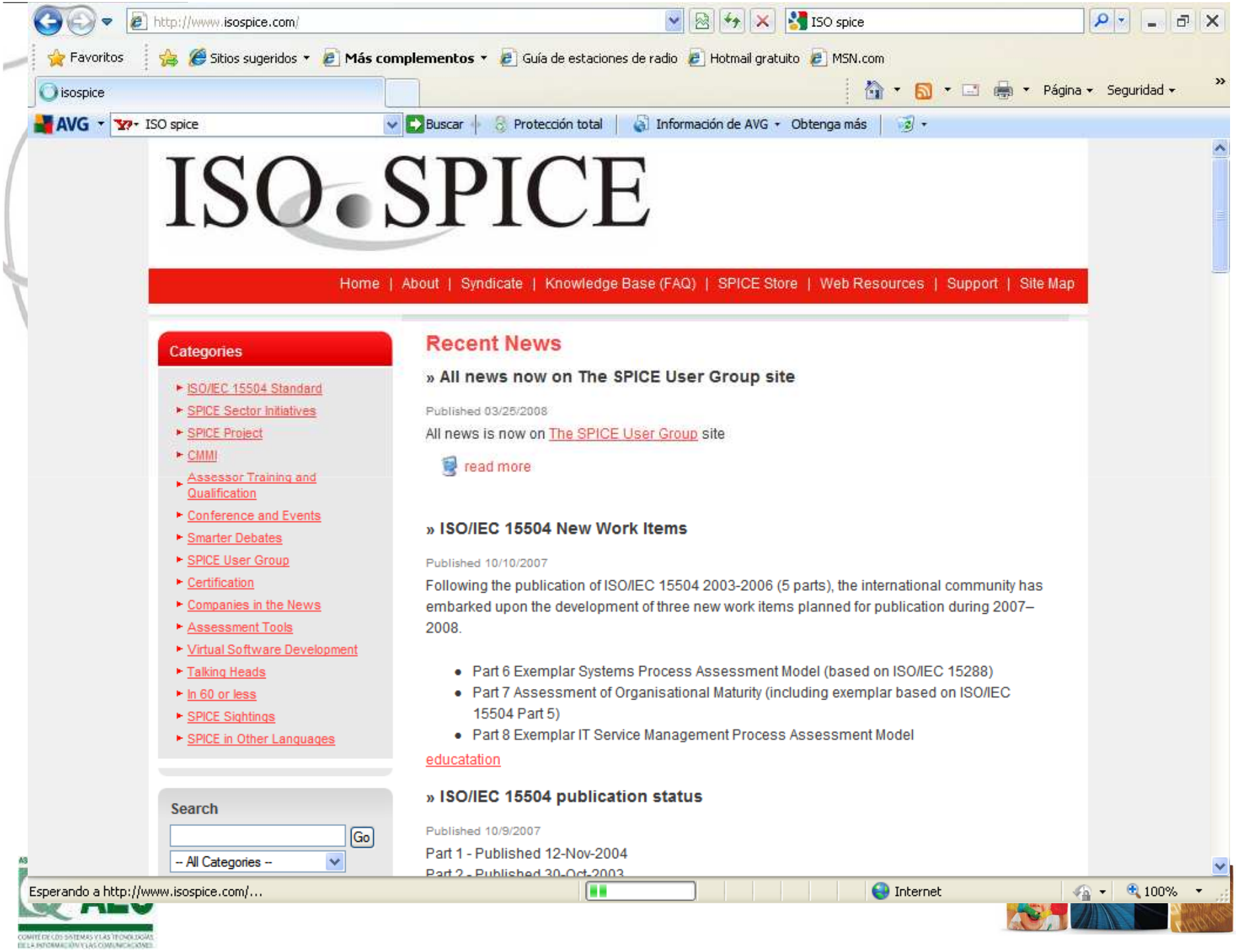
CMMI- DEV
CMMI- ACQ
CMMI - SVC


Level
Capability
Result
5 Optim-izing
Continuous Process Improvement
Organizational Innovation & Deployment
Causal Analysis & Resolution
Productivity & Quality
4 Quanti-tatively Managed
Quantitative Management
Quantitative Process Management
Software Quality Management
3 Defined
Process Standardization
Requirements Development
Technical Solution
Product Integration
Verification
Validation
Organizational Process Focus
Organizational Process Definition
Organizational Training
Integrated Product Management
Risk Management
Integrated Teaming
Integrated Supplier Management
Decision Analysis & Resolution
Organizational Environment for Integration
2 Managed
Basic Project Management
Requirements Management
Project Planning
Project Monitoring & Control
Supplier Agreement Management
Measurement & Analysis
Product & Process Quality Assurance
Configuration Management
1 Initial
Heroic Efforts
Design
Develop
Integrate
Test
Risk & Waste


Leveraging
Acting
Initiating
Diagnosing
Establishing
The
IDEAL
Model
Stimulus for Improvement
Set Context & Establish Sponsorship
Establish Improvement Infrastructure
Appraise Current Practice
Develop Recommendations & Document Results
Set Strategy & Priorities
Plan Actions
Establish Action Teams
Plan, Execute, & Track Installation
Plan & Execute Pilots
Define Processes & Measure
Document & Analyze Lessons
Revise Organizational Approach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Published 10/10/2007
Following the publication of ISO/IEC 15504 2003-2006 (5 parts), the international community has embarked upon the development of three new work items planned for publication during 2007–2008.
Part 6 Exemplar Systems Process Assessment Model (based on ISO/IEC 15288)
Part 7 Assessment of Organisational Maturity (including exemplar based on ISO/IEC 15504 Part 5)
Part 8 Exemplar IT Service Management Process Assessment Model
educatation
» ISO/IEC 15504 publication status
Published 10/9/2007
Part 1 - Published 12-Nov-2004
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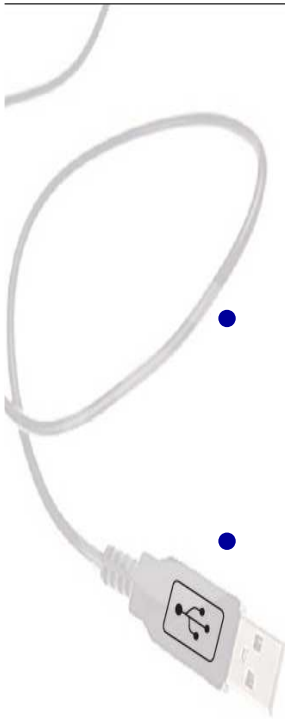
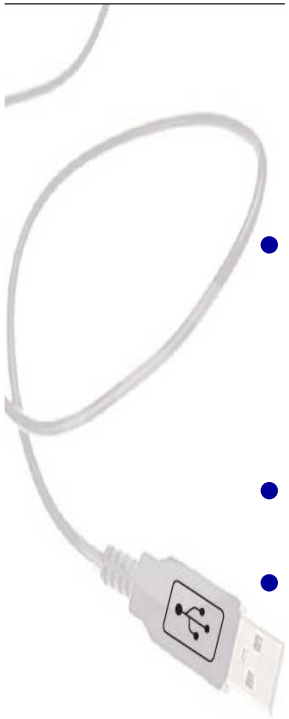


Software Engineering tendencies

- Embedded and reactive systems is maybe the bigger and emerging software market in Europe. UML 2.0 supports the design of reactive systems
- CBSE
  - Component Based Software Engineering: more and more systems are built using pre-existant components from container libraries
  - Fine-grain components as Java beans, or OTS (Off-the-shelf) components
- Software engineering methods for distributed systems
  - Internet based applications
  - Mobile devices: pervasive and ubiquitous computing
- Software Product Lines
  - Families of products



Software Engineering tendencies II

- Empirical Software Engineering
  - Use of experiments
  - Use of metrics
- Requirements Engineering
- Model Driven Engineering
  - Goal oriented models
  - Agent oriented models
- Software (process and product) quality, Quality models
- Process technology: process modelling, assessment and improvement, agile processes
- Aspect orientation
- Services computing (SaaS: Software as a Service)

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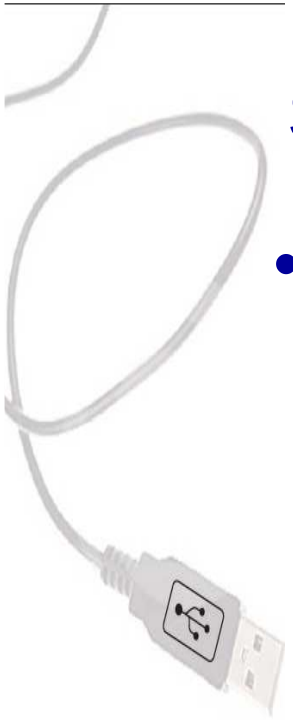

Saas: Software as a Service

- **Software as a Service** (**SaaS**, typically pronounced 'sass') is a model of software deployment whereby a provider licenses an application to customers for use as a service on demand. SaaS software vendors may host the application on their own web servers or download the application to the consumer device, disabling it after use or after the on-demand contract expires. The on-demand function may be handled internally to share licenses within a firm or by a third-party application service provider (ASP) sharing licenses between firms (Wikipedia)

SaaS

- Conceptos relacionados:
  - SOA (Service Oriented Architecture)
  - Web service
  - Cloud computing

- Google Docs, Flickr, etc…

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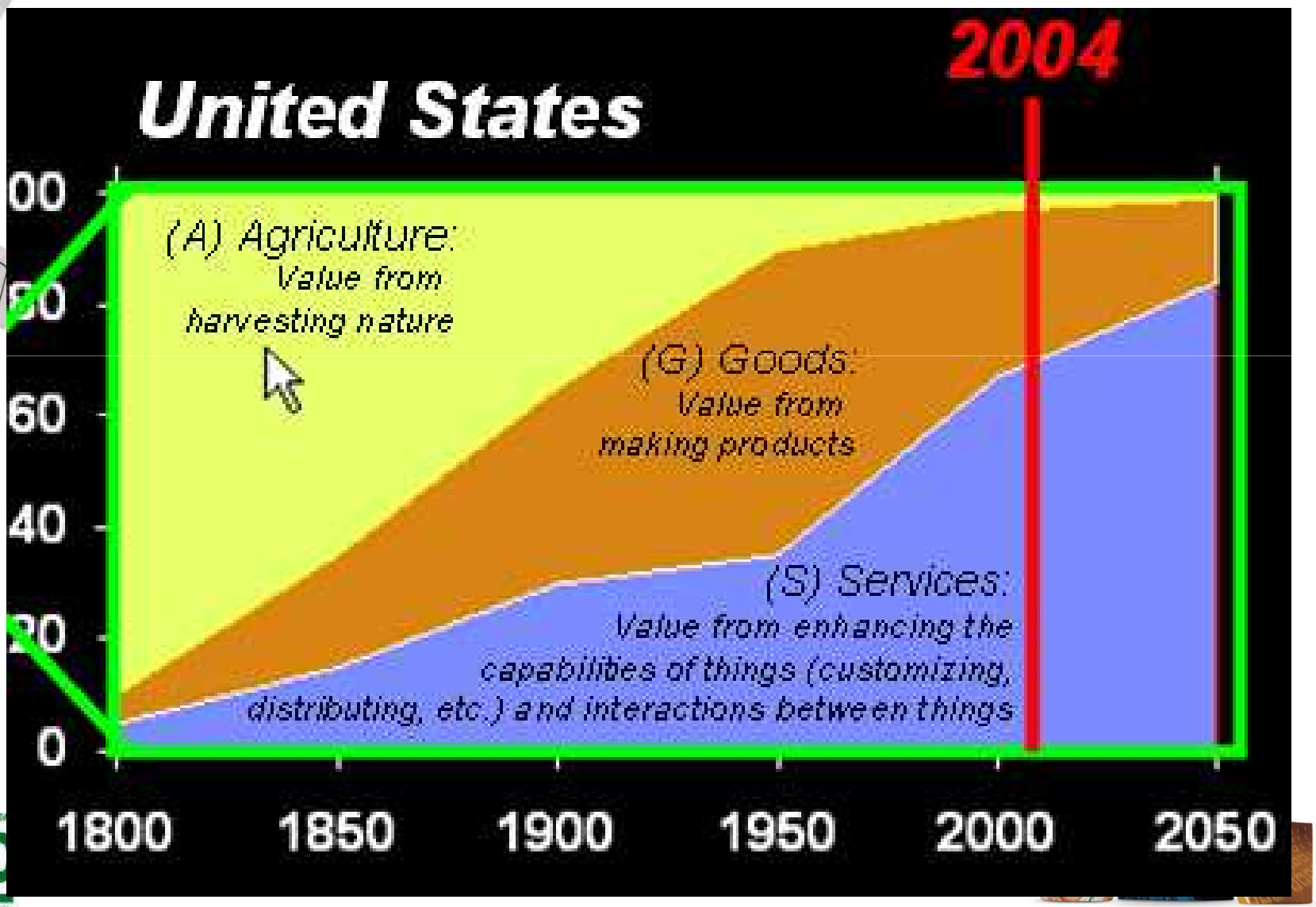
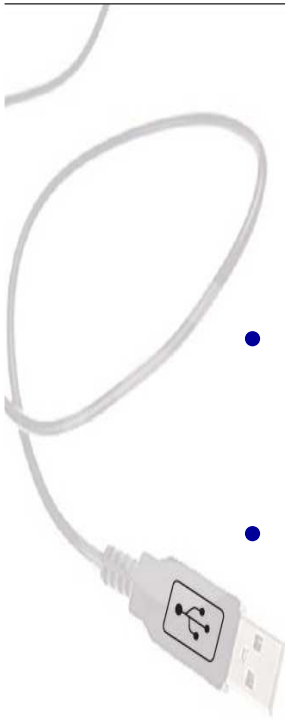
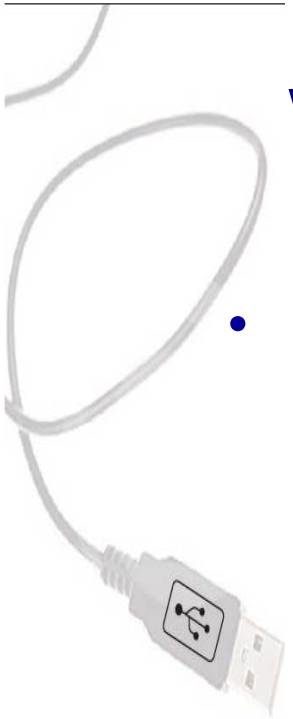
Source: IBM, Jim Spohrer





SSME (Service Science, Management and Engineering)

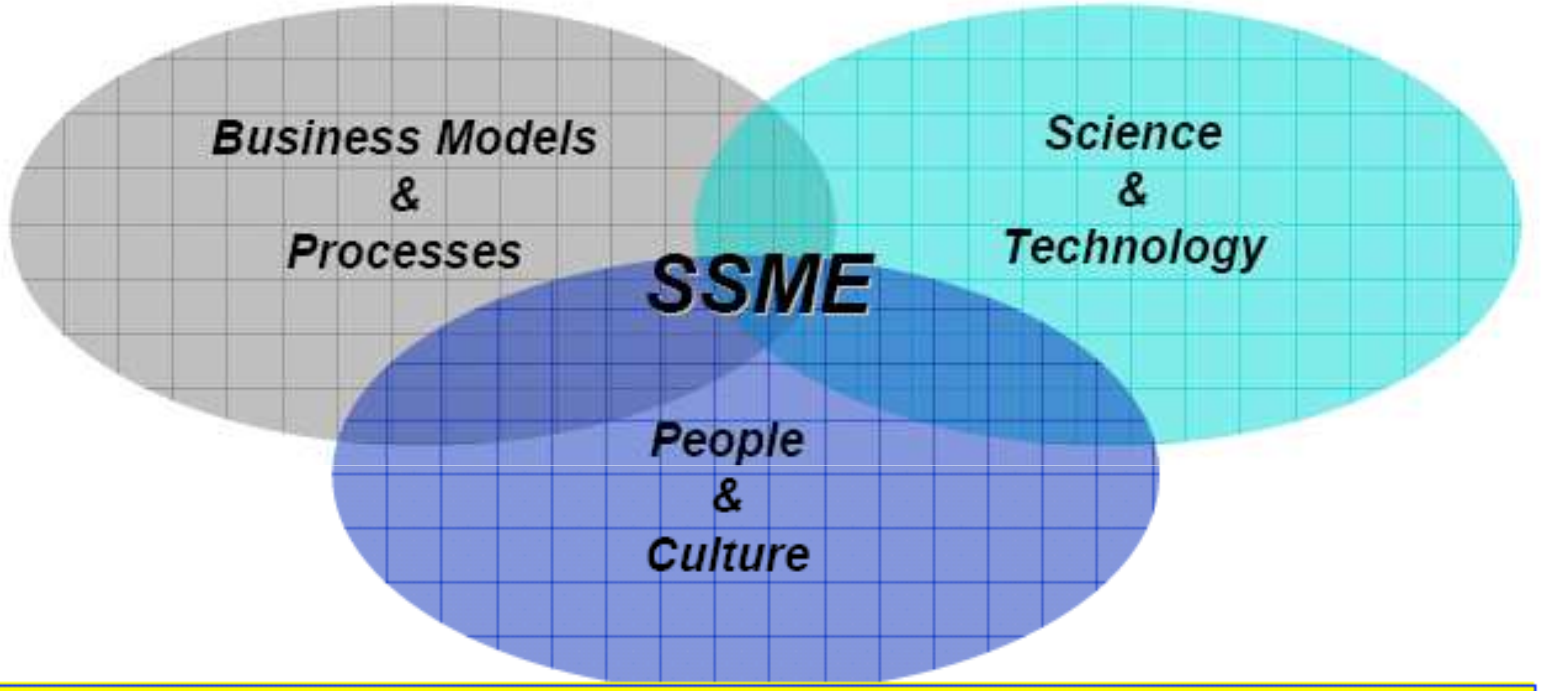
- Service Science: foundations on services, but more precisely, “science” as a discipline (as in USA, not as in Europe)
- Service Management: from business schools, management applied to the tertiary sector (primary: raw materials or commodities; secondary: production of goods)
- Service Engineering: specially Service Computing, that is, technology that implements services (SOA, web services, information systems, etc.)
- Services are economic activities offered by one party to another. A service is a time-perishable, intangible experience performed for a customer acting in the role of a co-producer
- *Servicitation:* Business transition to services (Rolls Royce example)



What is SSME? **Source: IBM, Liva Sbovoda**

- SSME is a multidisciplinary application of science, management,and engineering disciplines to services
  - – Science is a way to create knowledge through tools and methods studying Services
  - – Engineering is a way to apply knowledge produced by science outputs and create new value
  - – Management improves the process of creating and capturing value
- The promise of SSME is that the study of service systems, their design, evolution, processes and data, will increase our understanding of the services business – how to increase productivity, improve quality, control risk, innovate for growth and operate in dynamic environments
- SSME needs to be developed as an **academic curriculum** and **research area**

SSME is multidisciplinary / cross-disciplinary …

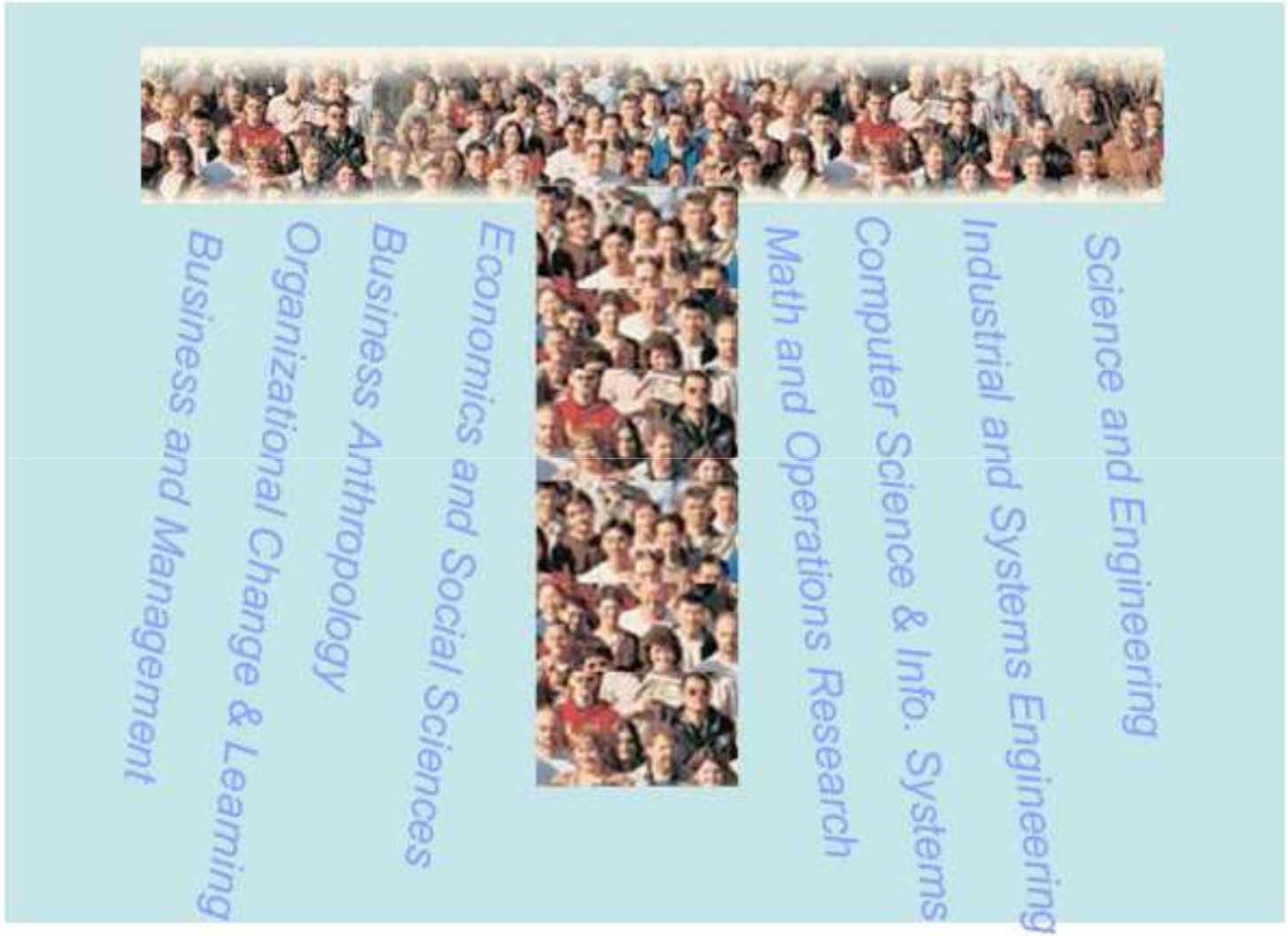


Service systems are complex adaptive systems - configurations of people, technology, internal and external service systems connected by value propositions, and shared information (language, laws, measures, models, etc.)

Source: IBM, Liva Sbovoda

Service scientists need to be both broad and deep

Source: IBM, Liva Sbovoda



T-shaped people – They speak the language of many disciplines, and are deep in at least one area

A modo de conclusión

- Los procesos de la Ingeniería de Software bien aplicados, inciden muy directamente en la cuenta de resultados: “comprar barato sale doblemente caro”
- Muchos estudios y publicaciones avalan y muestran los buenos resultados de la aplicación de procesos de mejora de la calidad (como CMMI), especialmente en el ajuste de costes a los previstos

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Muchas gracias por su atención

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