

# La integración de herramientas de requisitos en el estándar CMMI

A. Díez Gil, F.J. López Minaya

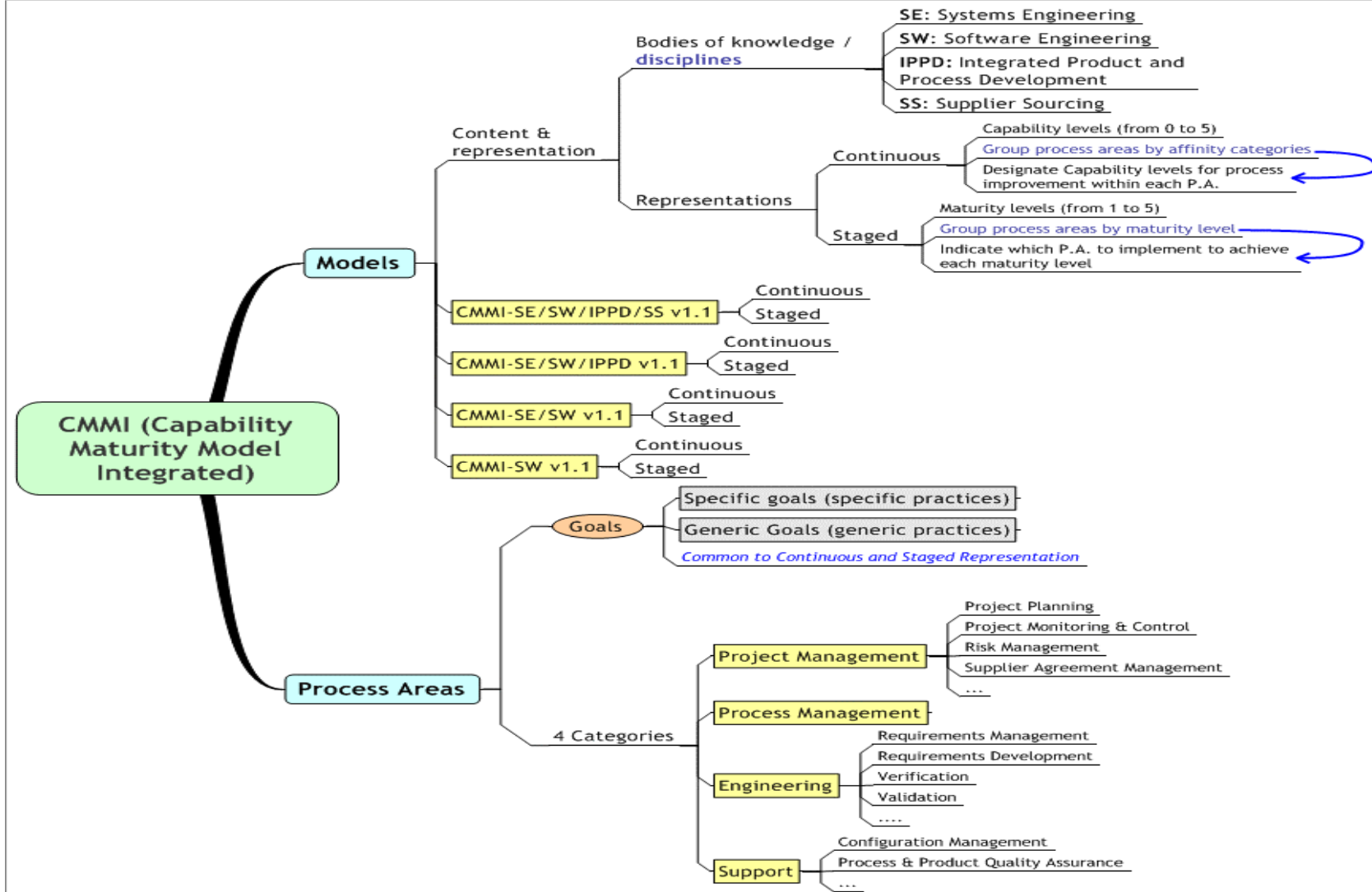


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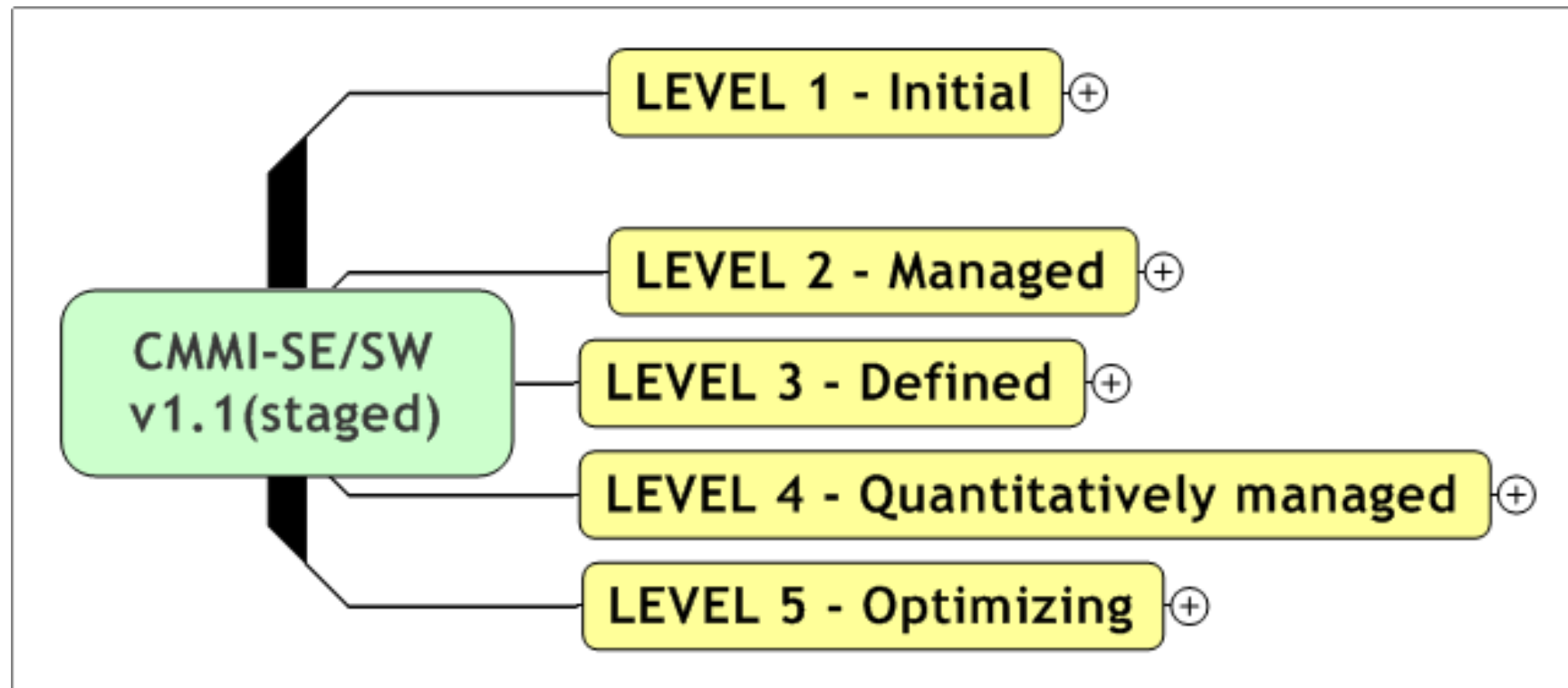
# CMMI (Capability Maturity Model Integrated)

- Developed in the SEI (Software Engineering Institute), belonging to Carnegie Mellon University in Philadelphia
- De facto standard in software industry
- It is a set of models that describe principles and practices related with the maturity of processes in an organization
- Its goal is to provide a framework for process improvement in organizations
- CMMI combines three models:
  - Capability Maturity Model for Software (SW-CMM)
  - Electronic Industries Alliance Interim Standard (EIA/IS) 731
  - Integrated Product Development Capability Maturity Model (IPD-CMM)

# CMMI Components

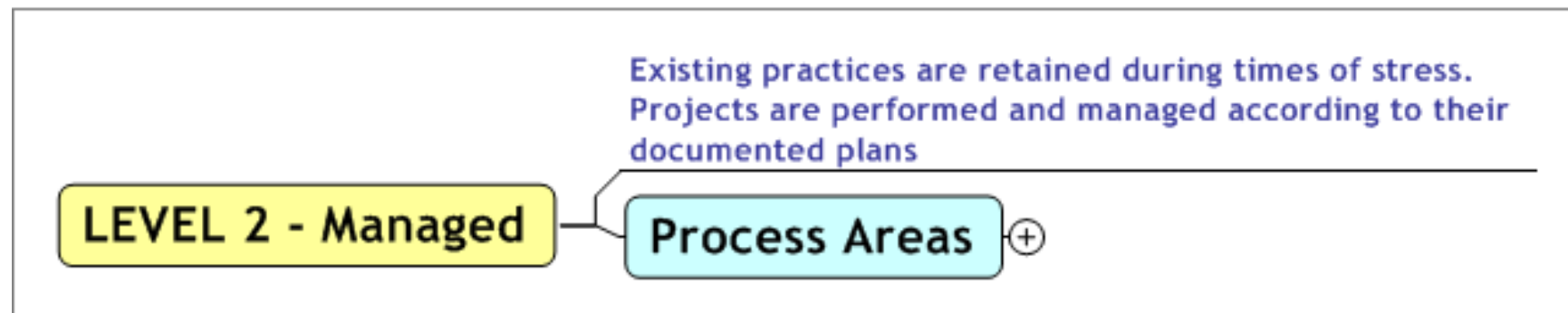


# CMMI-SE/SW v1.1(staged)



# CMMI LEVEL 2 - Managed

## GG: Institutionalize a Managed Process



### Suggested resources:

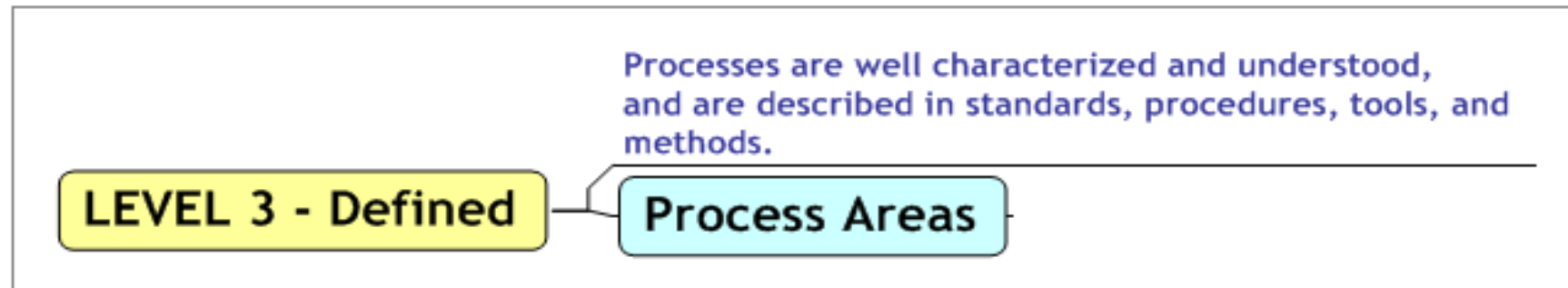
- Requirements tracking tools
- Traceability tools

## CMMI LEVEL 2 - Process Areas

- Requirements Management
- Project Planning
- Project Monitoring and Control
- Supplier Agreement Management
- Measurement and Analysis
- Process and Product Quality Assurance
- Configuration Management

# CMMI LEVEL 3 - Defined

## GG: Institutionalize a Defined Process



### Suggested resources:

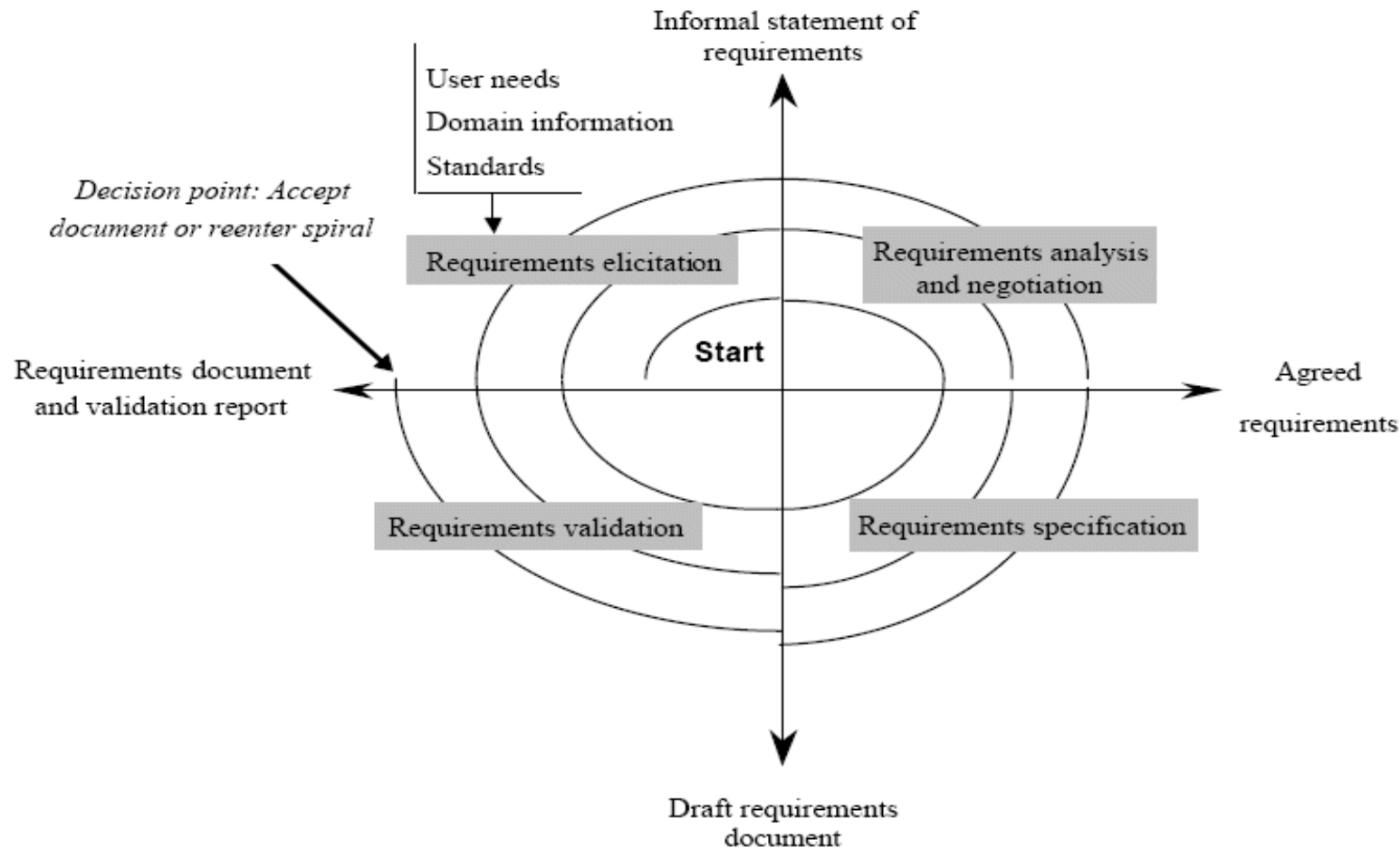
- **Requirements specification tools**
- **Scenario definition and management tools**
- **Requirements tracking tools**

## CMMI LEVEL 3 - Process Areas

- Requirements Development
- Technical Solution
- Product Integration
- Verification
- Validation
- Organizational Process Focus
- Organizational Process Definition
- Organizational Training
- Integrated Project Management
- Risk Management
- Decision Analysis and Resolution



# IRqA and Requirements Engineering



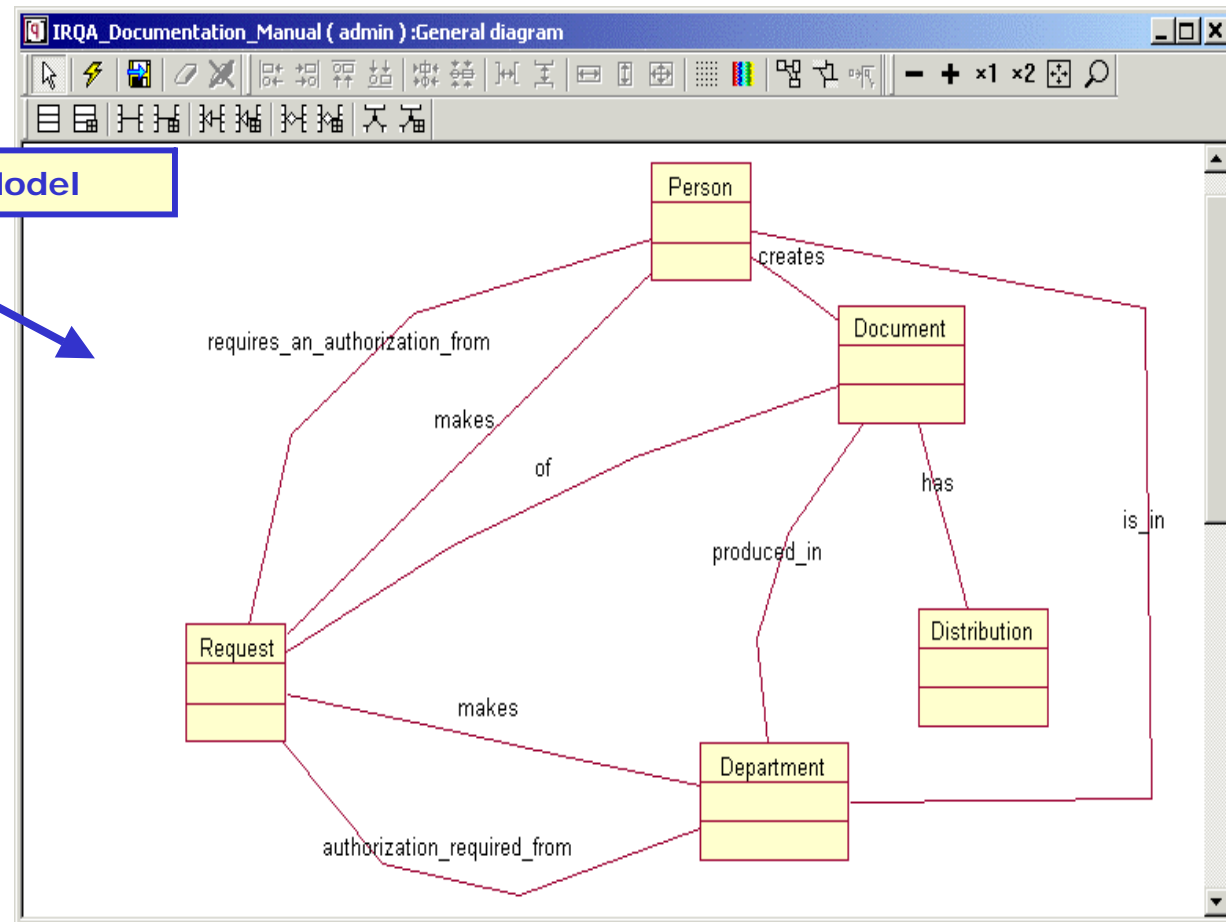
**IRqA: CASE tool that supports the whole RE cycle**

## IRqA and CMMI Level 2: P.A. Requirements Management

Specific Goals	Specific Practices	IRqA Functions
SG 1 Manage Requirements	SP 1.1 Obtain an Understanding of Requirements	Requirements capture and organization User defined attributes Acceptance Criteria Problem Domain Models
	SP 1.2 Obtain Commitment to Requirements	User defined attributes Reports generation
	SP 1.3 Manage Requirements Changes	Requirements versions Baselines (next version) Hierarchy of requirements User defined relationships between requirements Traceability Matrix Suspect relationships management Requirements capture – Changes acceptance/rejection mechanism (next version)
	SP 1.4 Maintain Bidirectional Traceability of Requirements	Hierarchy of requirements User defined relationships between requirements Traceability Matrix Traceability to Analysis and Design elements

# IRqA Problem Domain Models

## Business Concepts Model



## IRqA and CMMI Level 3: P.A. Requirements Development (I)

Specific Goals	Specific Practices	IRqA Functions
SG 1 Develop Customer Requirements	SP 1.1 Elicit Needs	<b>Use Cases Scenarios</b>
	SP 1.2 Develop the Customer Requirements	<b>Requirements Capture Hierarchy of requirements User defined attributes Acceptance Criteria Relationships between requirements and use cases</b>

# IRqA Scenarios

Scenarios

The screenshot shows the IRqA Scenarios tool interface. On the left, a table lists scenarios:

Code	Name
SC1	Register document
SC2	Unsuccessful document registration

The main area displays the details for a selected scenario. The 'Details' tab is active, showing fields for Author (Admin), Date (14/05/2003), Time (14:27:58), Access partition (Testing), and a Description field. Below these is a table of scenario steps:

ID	Actor	Event	Direction
1	librarian	Selects operation (register documents)	---->
2	System	The system will check whether the person identified is the librarian, as that is the only one with rights to perform this	<----
3	librarian	Requests identification	<----
4	System	The system will ask the user for identification by entering login and password.	<----
5	librarian	Enters (login, password)	---->
6	librarian	Requests file name	<----
7	librarian	Enters file name	---->

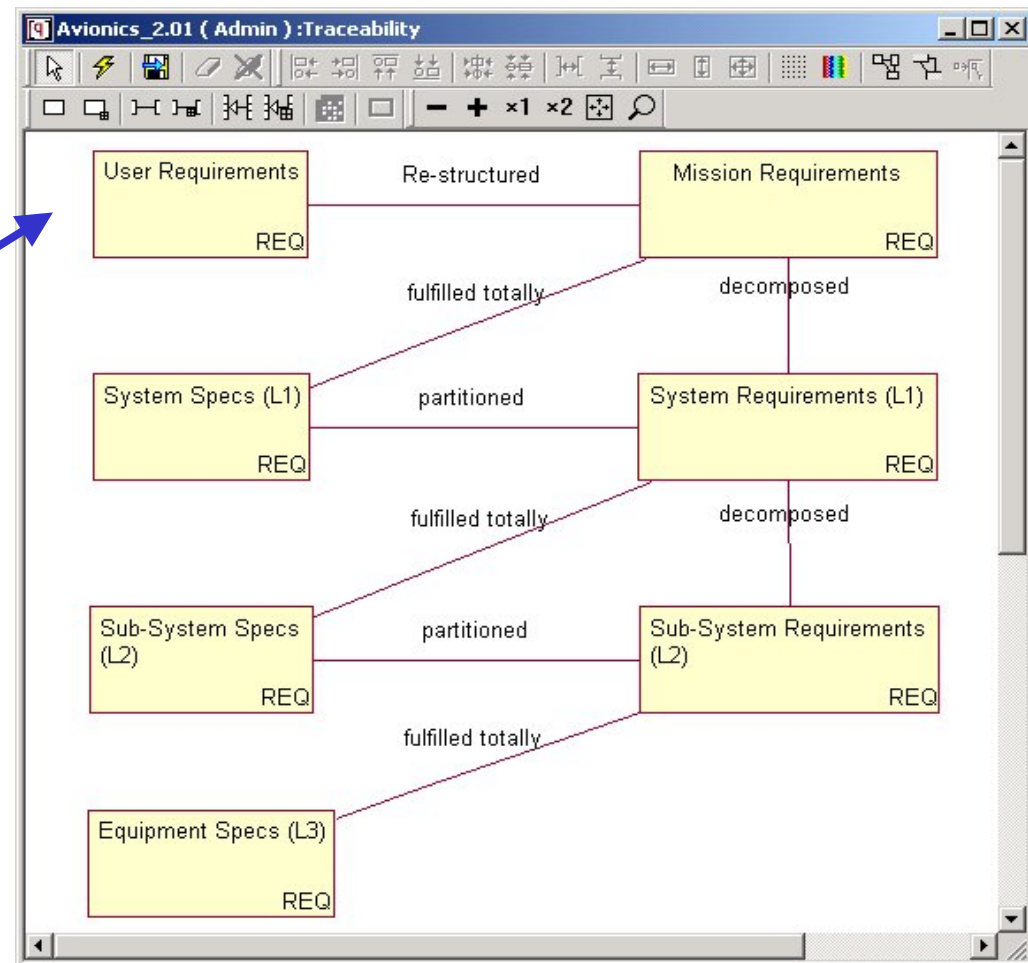
At the bottom, there are buttons for Insert, Edit, Delete, and Update.

## IRqA and CMMI Level 3: P.A. Requirements Development (II)

Specific Goals	Specific Practices	IRqA Functions
SG 2 Develop Product Requirements	SP 2.1 Establish Product and Product-Component Requirements	<b>Requirements capture</b> <b>User defined relationships between requirements</b> <b>Block diagrams</b>
	SP 2.2 Allocate Product-Component Requirements	<b>Requirements capture</b> <b>Requirements hierarchy</b> <b>User defined relationships between requirements</b> <b>Use Cases</b> <b>Processes</b> <b>Integration with UML tools</b>
	SP 2.3 Identify Interface Requirements	<b>Actors/External Entities</b> <b>Use Case diagrams</b> <b>Context diagrams and DFDs</b> <b>Relationships between requirements and actors/external entities</b>

# IRqA Block diagrams

**Block Diagrams:  
Specification structure**

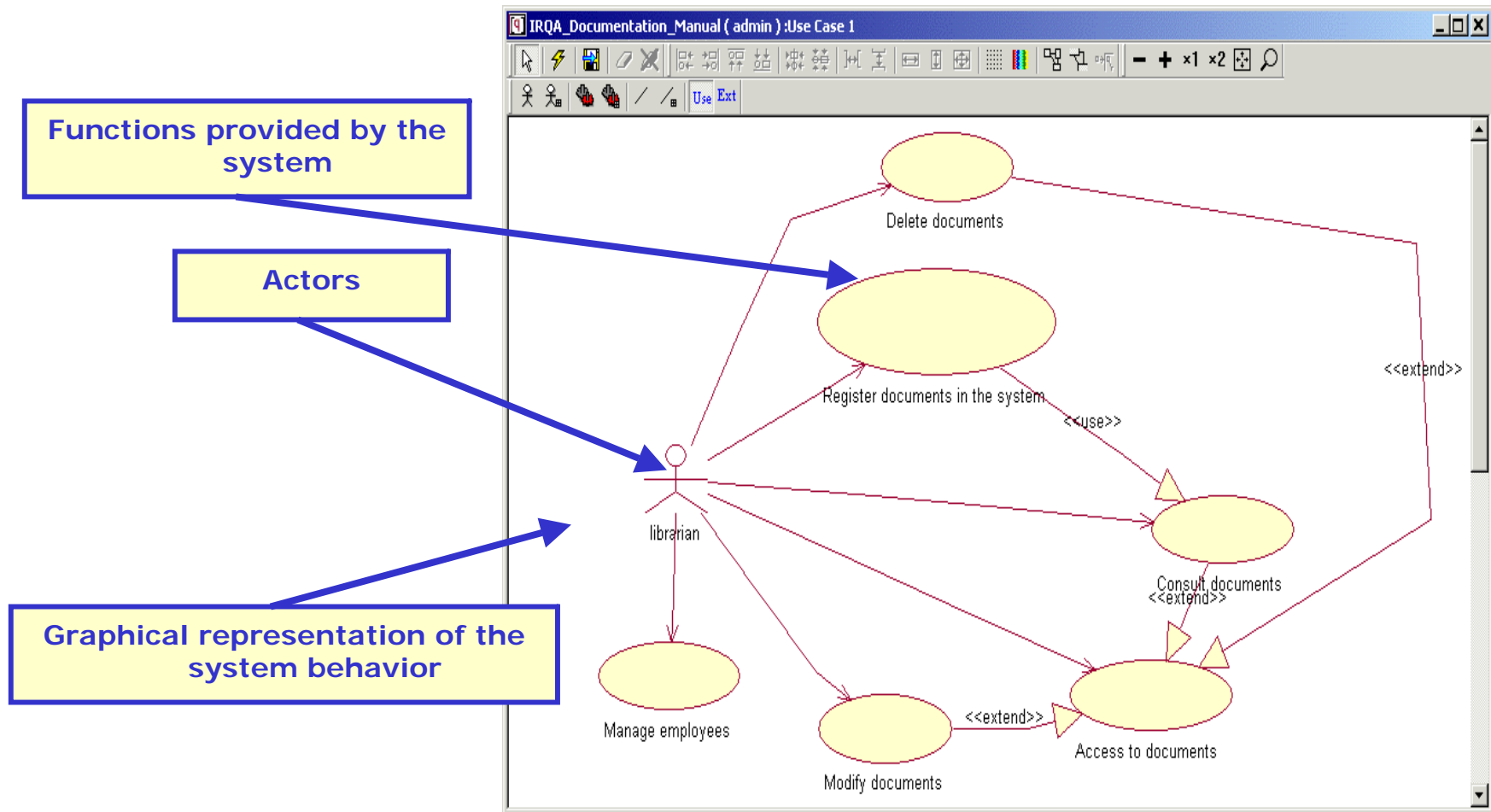


## IRqA and CCMI Level 3: P.A. Requirements Development (III)

Specific Goals	Specific Practices	IRqA Functions
SG 3 Analyze and Validate Requirements	SP 3.1 Establish Operational Concepts and Scenarios	Use Cases Scenarios State diagrams Requirements capture
	SP 3.2 Establish a Definition of Required Functionality	Requirements and use cases categorization Use Case diagrams State diagrams Relationships between requirements and use cases
	SP 3.3 Analyze Requirements	Problem Domain Models Automatic Analyzer Requirements Categorization Requirements hierarchy User defined relationships between requirements Complexity report Consistency check
	SP 3.4 Analyze Requirements to Achieve Balance	Requirements categorization Attributes
	SP 3.5 Validate Requirements with Comprehensive Methods	Use Cases Scenarios Relationships between requirements and use cases



# IRqA Use Case diagrams



# Conclusions

- Requirements Engineering is a key activity in CMMI:
  - PA-Requirements Management: CMMI Level 2
  - PA-Requirements Development: CMMI Level 3
- Activities in these process areas are not only the usual functions in Requirements Management, but also others such as business models definition, interfaces and system functionalities specification, requirements validation, etc.
- IRqA is a Requirements Engineering tool that implements the functions needed to support both process areas