

June. **2009**



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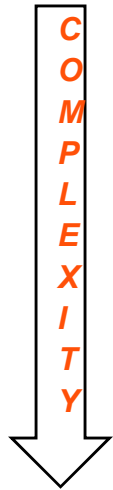
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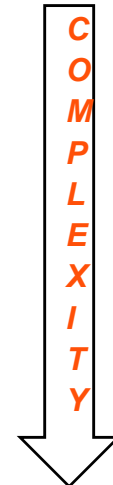
SPICE FOR SMALL PROJECTS

Bitron's Experience

WITH THE AID OF ELISABETTA MASUERO / MARCO CASSOTTA BITRON'S SWQA TEAM

TWO MAIN PRODUCT BRANCHES:**•AUTOMOTIVE:**

- SEAT HEATER,
- MIRROR FOLDER,
- SEAT BELT REMINDER,
- DOOR LOCK,
- WINDOW LIFTER,
- SUNROOF CONTROL
- CLIMATE CONTROL

**•APPLIANCES:**

- (DELAY) TIMERS
- USER INTERFACES,
- INVERTERS,
- MOTOR CONTROLLERS,
- MAINBOARD FOR WASHING MACHINES
- GAS BOILERS

**FROM SMALL PROJECTS TO BIG ONES TAKING CARE OF SAFETY AND QUALITY**

IS CONFORM TO ISO/IEC 12207 INTERNATIONAL STD

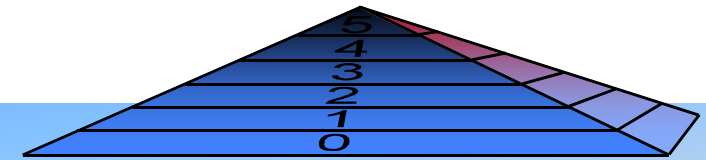
**ASSESSED BY I.S.T.I. -C.N.R. PISA UP TO LEVEL 3 OF ISO 15504,
NAMELY "S.P.I.C.E." ACCORDING TO FIAT AND H.I.S. SCOPES**

SPICE

is an acronym for

Software Process Improvement Capability dEtermination

Optimizing
Predictable
Established
Managed
Performed
Incomplete



CODING ACCORDING TO M.I.S.R.A. 2004 RULES

BITRON IS MEMBER OF  CONSORTIUM SINCE 2006

**BITRON IS ONE OF THE FOUNDERS OF THE S.P.I.N. ITALY
(Software Process Improvement Network)**



THE PROBLEM

TO APPLY A FULLY “SPICE COMPLIANT” DEVELOPMENT PROCESS CAN BE TOO EXPENSIVE (TIME & RESOURCES) FOR SMALL PROJECTS, LASTING TWO OR THREE MONTHES AND WITH A LIMITED BUDGET.

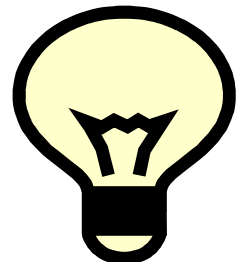
HOW TO AVOID A “QUICK AND DIRTY” APPROACH ?

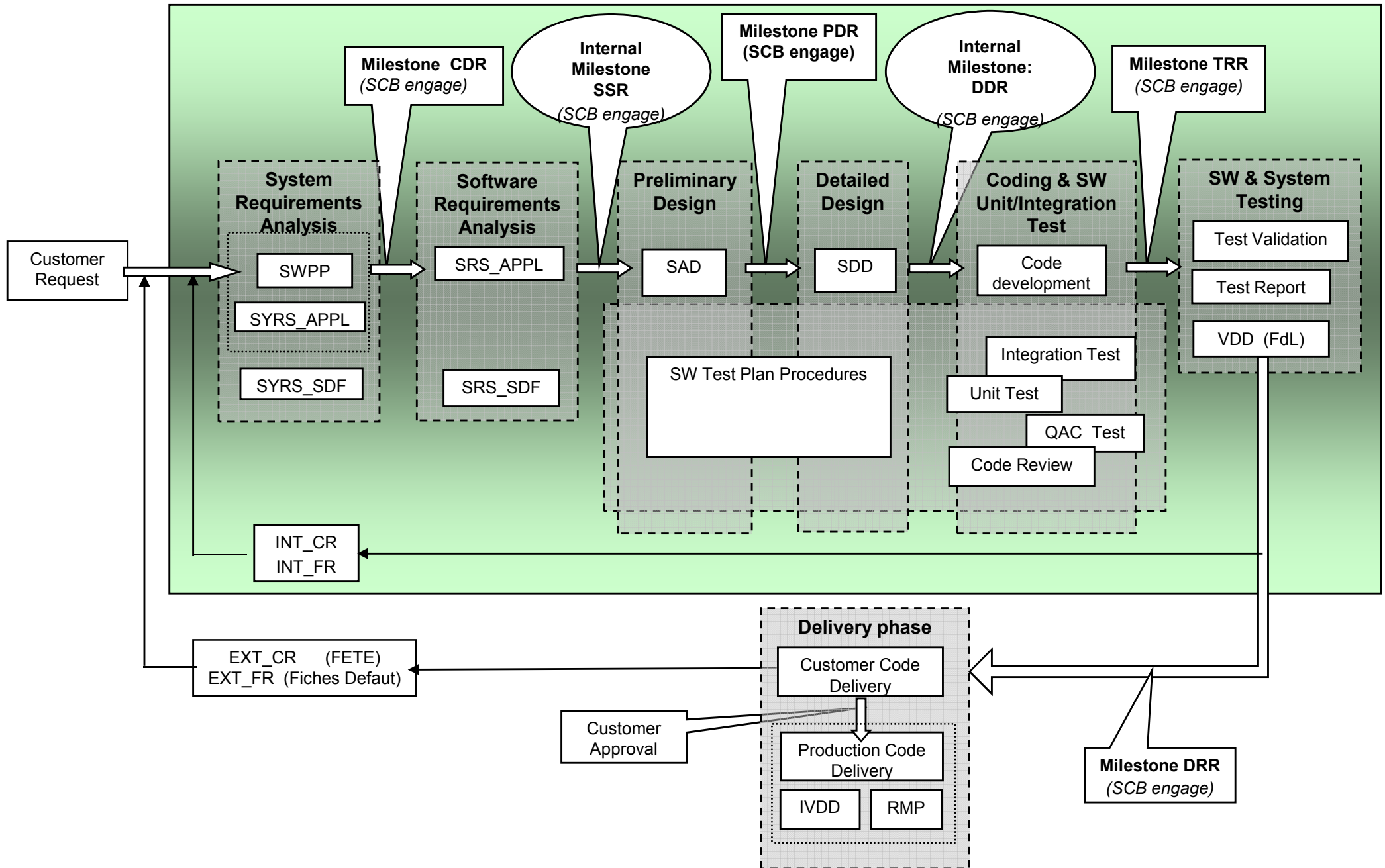
STILL MAINTAINING QUALITY AND A CONSOLIDATED PROCESS.

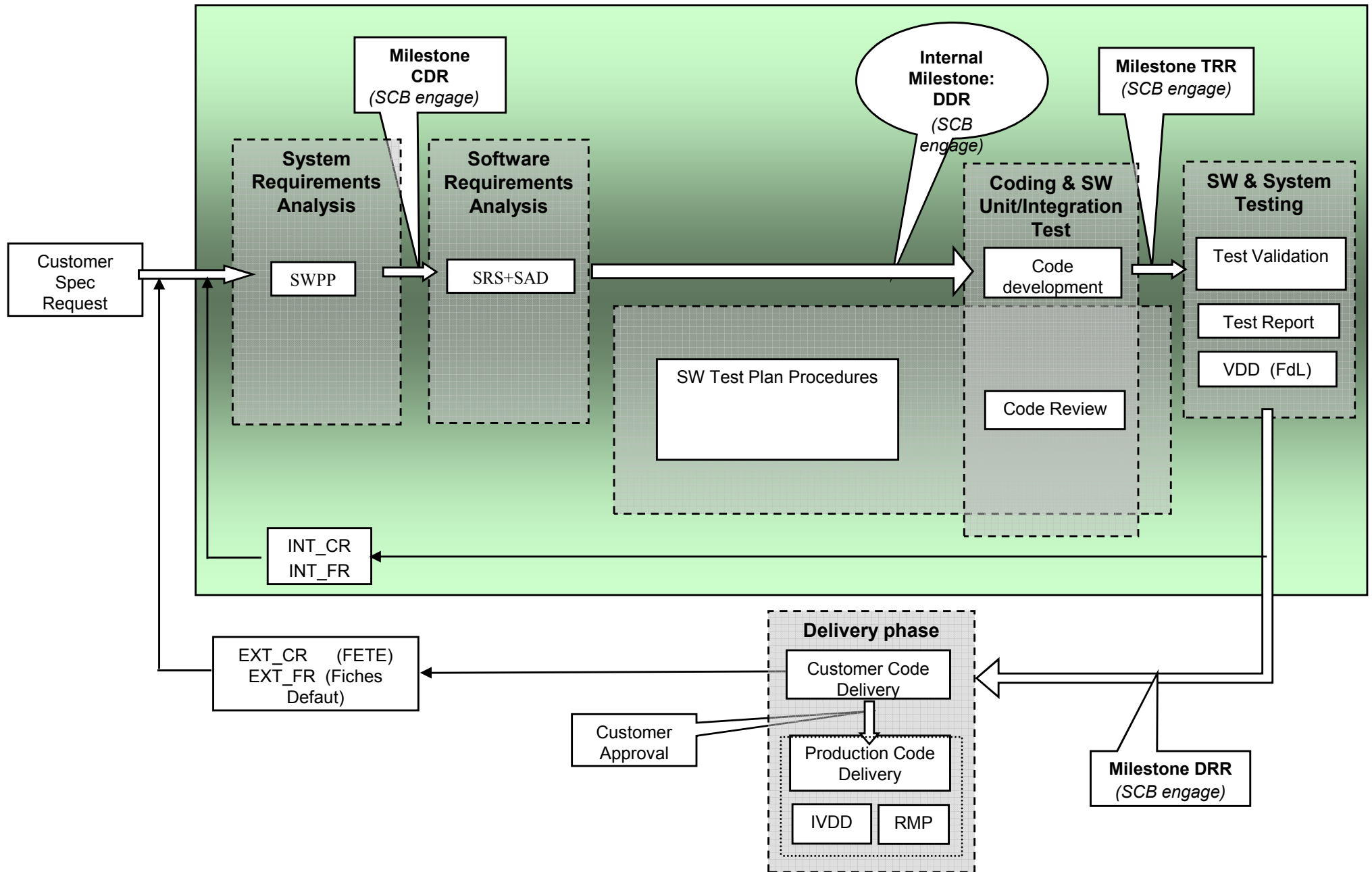
BITRON SOLUTION

IS TO CUSTOMIZE THE SOFTWARE LIFE CYCLE TAKING CARE OF PRODUCT’S BEING DEVELOPED COMPLEXITY AND ACCORDING TO CUSTOMER REQUESTS. THEREFORE WE HAVE DEFINED:

- **Full Process LifeCycle**
- **Short Process LifeCycle**







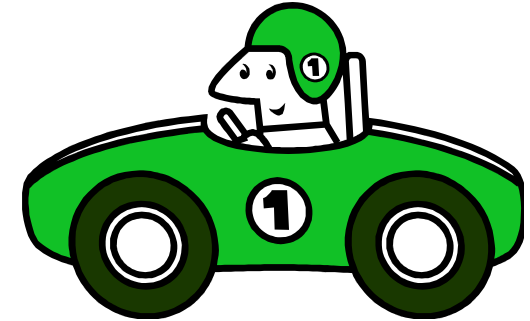
THE DECISION WHETHER TO APPLY THE FULL OR THE SHORT MODEL IS BASED UPON SEVERAL KEY FACTORS AMONG WITH :

- **AUTOMOTIVE OR DOMESTIC APPLIANCE (USUALLY LESS DEMANDING)**
- **CUSTOMER REQUIREMENTS**
- **SHORT DEVELOPMENT TIME**
- **COMPLEXITY & SAFETY OF ECU**
- **BUDGET vs COST**



THE DESIGNATED PROJECT LEADER TOGETHER WITH QUALITY PEOPLE, THE SOFTWARE DEPARTMENT RESPONSIBLE AND THE PRODUCT'S PROGRAM MANAGER TAKE THE DECISION.

ONCE THE DECISION HAS BEEN MADE, TO SPEED UP THE WHOLE PROCESS (EITHER IN THE FULL OR IN THE SHORT MODEL), SEVERAL TOOLS ARE USED.



- THE QUOTATION PROCESS IS AUTOMATED BY MEANS OF A DATABASE REPOSITORY LAYING ON THE INTRANET (PROPRIETARY)**
- ALL PROJECTS PHASES AND RELATED DOCUMENTS ARE MANAGED BY THE CONFIGURATION MANAGEMENT TOOL (SERENA)**
- DESIGN, TEST & QUALITY DOCUMENTS' TEMPLATES HAVE BEEN PREPARED**
- SW MODULES LIBRARY PROVISION FOR REUSABLE SOFTWARE**
- SW TEST AUTOMATIZATION WITH A GENERAL PURPOSE TEST BENCH**

logout

ricerca

ricerca avanzata

compilazione

costo sviluppo offerta
preventivo
acquisizione

correzione

costo sviluppo offerta
preventivo



attrezzature

attività	C.d.C.	euro
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viaggi

Frequenza n°

riconosciuti dal cliente

progettazione: €

rischi

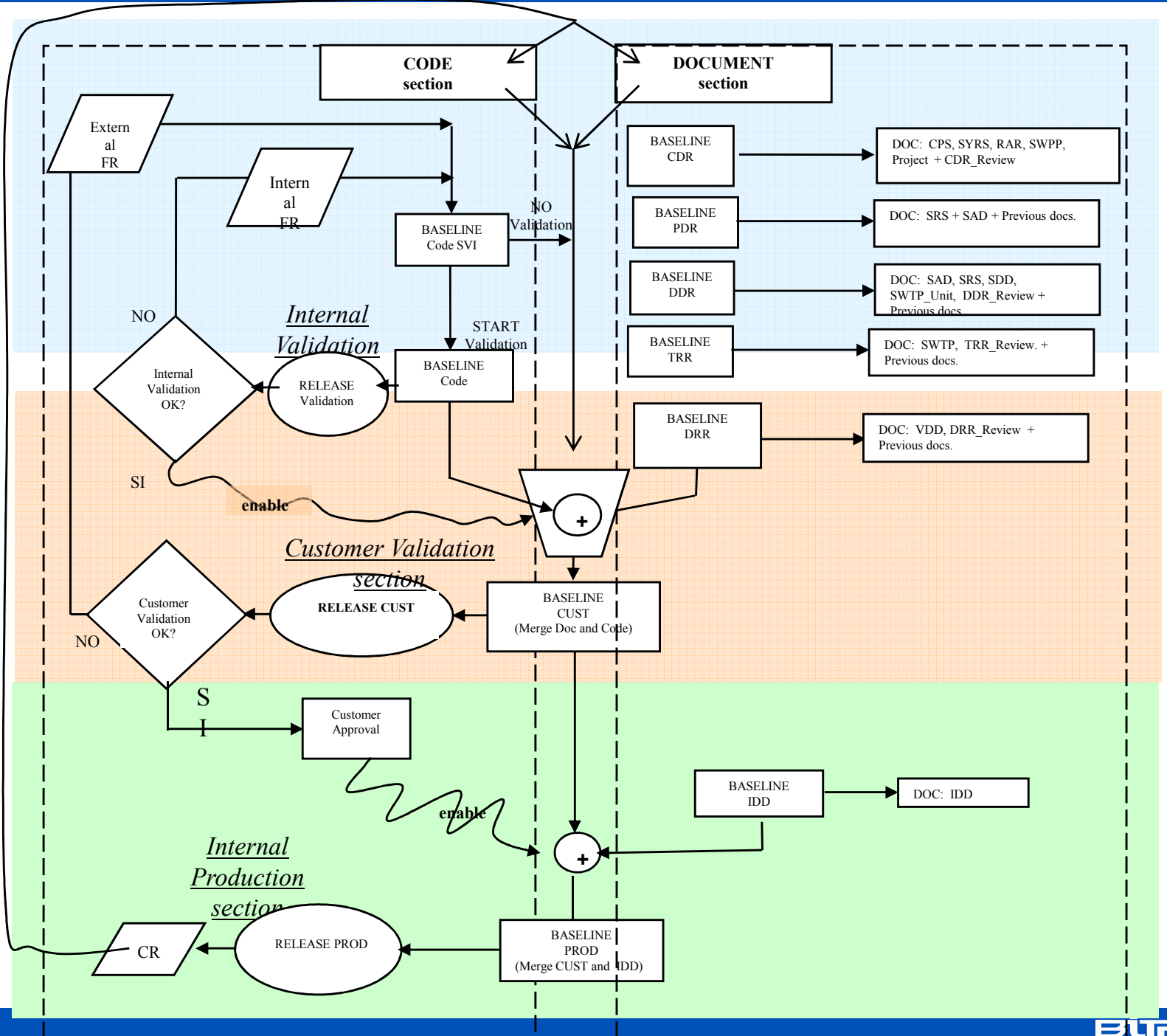
serena

tipologia di prodotto:

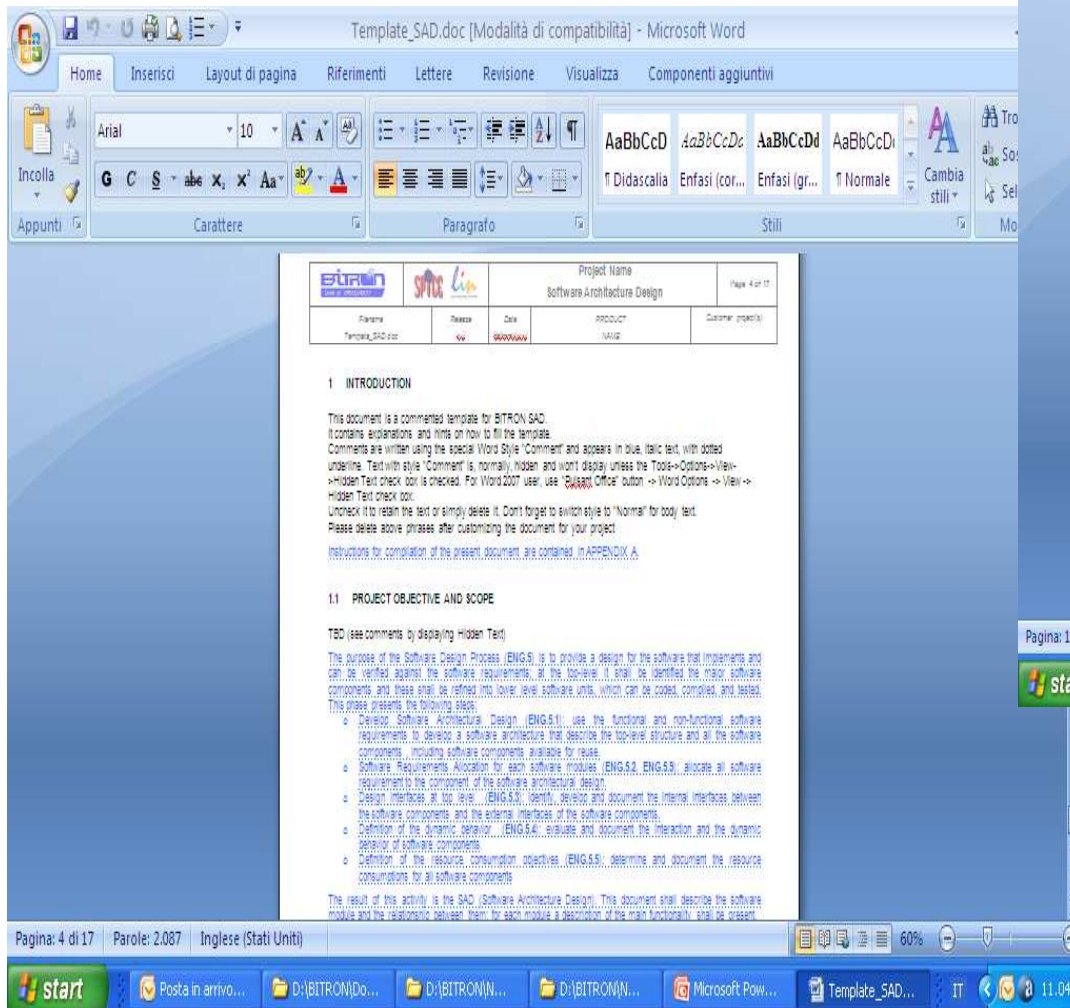
- nessuna richiesta
- short
- full

THE CONFIGURATION MANAGEMENT TOOL HAS BEEN CUSTOMIZED TO BE BEST SUITABLE TO OUR PROCESS.

THE AUTOMATED MAILING SYSTEM WARNS EVERY TEAM MEMBER ABOUT ACTIVITIES AND DOCUMENTS.



DESIGN, TEST AND QUALITY



Template_SAD.doc [Modalità di compatibilità] - Microsoft Word

Home Inserisci Layout di pagina Riferimenti Lettere Revisione Visualizza Componenti aggiuntivi

Arial 10

Stili: Didascalia, Enfasi (cor...), Enfasi (gr...), Normale

Project Name: Software Architecture Design

1 INTRODUCTION

This document is a commented template for BITRON SAD. It contains explanations and hints on how to fill the template. Comments are written using the special Word Style "Comment" and appears in blue, italic text, with dotted underline. Text with style "Comment" is normally hidden and won't display unless the Tools->Options->View->Hidden Text check box is checked. For Word 2007 user, use "Display Office" button -> Word Options -> View->Hidden Text check box. Uncheck it to retain the text or simply delete it. Don't forget to switch style to "Normal" for body text. Please delete above phrases after customizing the document for your project.

Instructions for consultation of the present document, are contained in APPENDIX A.

1.1 PROJECT OBJECTIVE AND SCOPE

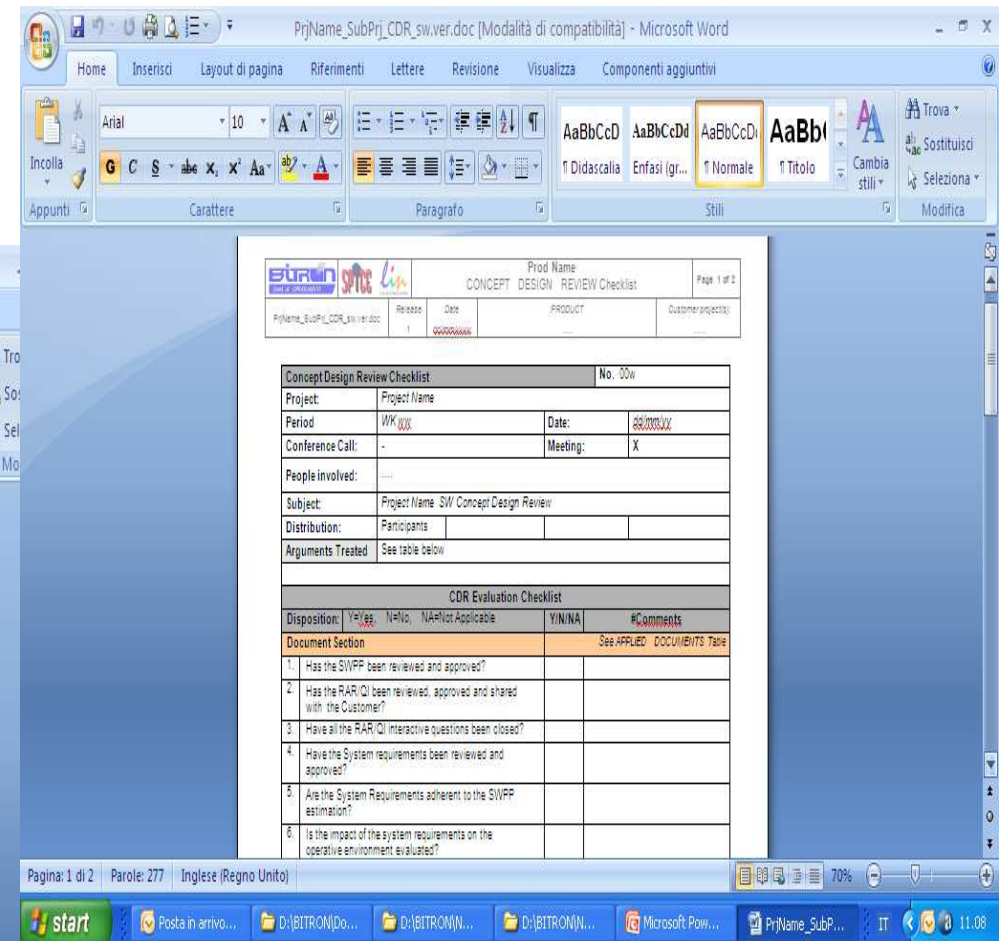
TED (see comments by displaying hidden text)

The purpose of the Software Design Process (ENG.5) is to provide a design for the software that implements and can be verified against the software requirements, at the discrete, it shall be identified the major software components and these shall be refined into lower level software units, which can be coded, compiled, and tested. This process presents the following steps:

- Develop Software Architectural Design (ENG.5.1): use the functional and non-functional software requirements to develop a software architecture that describe the top-level structure and all the software components, including software components available for reuse.
- Software Requirements Allocation for each software module (ENG.5.2, ENG.5.3): allocate all software requirement to the component of the software architectural design.
- Design interfaces at top level (ENG.5.4): identify, develop and document the internal interfaces between the software components and the external interfaces of the software components.
- Definition of the dynamic behavior (ENG.5.4): evaluate and document the interaction and the dynamic behavior of software components.
- Definition of the resource consumption objectives (ENG.5.5): determine and document the resource consumptions for all software components.

The result of this activity is the SAD (Software Architecture Design). This document shall describe the software module and the relationship between them; for each module a description of the main functional shall be present.

Pagina: 4 di 17 Parole: 2.087 Inglese (Stati Uniti)



PrjName_SubPrj_CDR_sw.ver.doc [Modalità di compatibilità] - Microsoft Word

Home Inserisci Layout di pagina Riferimenti Lettere Revisione Visualizza Componenti aggiuntivi

Arial 10

Stili: Didascalia, Enfasi (gr...), Normale, Titolo

Prod Name: CONCEPT DESIGN REVIEW Checklist

PrjName_SubPrj_CDR_sw.ver.doc	Release	Date	PRODUCT	Customer project(s)
	1	00/00/0000		

Concept Design Review Checklist No. 00w

Project:	Project Name		
Period:	WK 000	Date:	00/00/00
Conference Call:	-	Meeting:	X
People involved:	...		
Subject:	Project Name SW Concept Design Review		
Distribution:	Participants		
Arguments Treated:	See table below		

CDR Evaluation Checklist

Disposition:	Y=Yes	N=No	NA=Not Applicable	Y/N/A	#Comments
Document Section	See APPLIED OCCURENITS Table				
1. Has the SWPP been reviewed and approved?					
2. Has the RAR/QI been reviewed, approved and shared with the Customer?					
3. Have all the RAR/QI interactive questions been closed?					
4. Have the System requirements been reviewed and approved?					
5. Are the System Requirements adherent to the SWPP estimation?					
6. Is the impact of the system requirements on the operative environment evaluated?					

Pagina: 1 di 2 Parole: 277 Inglese (Regno Unito)

The screenshot displays the Serena Dimensions software interface. The main window is titled "[New] Serena Dimensions - [Folders and Items (PROVA_LIB:PROVA_LIB_2)]". The interface includes a menu bar (File, Edit, View, Item, Project, Tools, Window, Help), a toolbar, and a project tree on the left. The project tree shows a hierarchy: PROVA_LIB:PROVA_LIB_2 > LIB > STK > Doc > Test > PROVA_LIB > lar > Application > Communication > Global Include > Project > SelfProgrammingLib > Service > TestUnit > uP.

The main area displays "22 Related Items" in a table format:

Filename	Relationship	Revision	Specification	Status
Test.c	Owned	1.0	PROVA_LIB:A49.A-SW_SRC;1.0	READY FOR BA
Test.h	Owned	1.0	PROVA_LIB:A7.A-SW_SRC;1.0	READY FOR BA
TU_TestBlinkMgm.c	Owned	1.0	PROVA_LIB:A88.A-SW_SRC;1.0	READY FOR BA
TU_TestBlinkMgm.h	Owned	1.0	PROVA_LIB:A20.A-SW_SRC;1.0	READY FOR BA
TU_TestExternalWatchdog.c	Owned	1.0	PROVA_LIB:A36.A-SW_SRC;1.0	READY FOR BA
TU_TestExternalWatchdog.h	Owned	1.0	PROVA_LIB:A14.A-SW_SRC;1.0	READY FOR BA
TU_TestFlash.c	Owned	1.0	PROVA_LIB:A52.A-SW_SRC;1.0	READY FOR BA
TU_TestFlash.h	Owned	1.0	PROVA_LIB:A9.A-SW_SRC;1.0	READY FOR BA
TU_TestInputLin.c	Owned	1.0	PROVA_LIB:A107.A-SW_SRC;1.0	READY FOR BA
TU_TestInputLin.h	Owned	1.0	PROVA_LIB:A22.A-SW_SRC;1.0	READY FOR BA
TU_TestLedMgm.c	Owned	1.0	PROVA_LIB:A106.A-SW_SRC;1.0	READY FOR BA
TU_TestLedMgm.h	Owned	1.0	PROVA_LIB:A18.A-SW_SRC;1.0	READY FOR BA
TU_TestOutputLed.c	Owned	1.0	PROVA_LIB:A108.A-SW_SRC;1.0	READY FOR BA
TU_TestOutputLed.h	Owned	1.0	PROVA_LIB:A21.A-SW_SRC;1.0	READY FOR BA
TU_TestPort.c	Owned	1.0	PROVA_LIB:A85.A-SW_SRC;1.0	READY FOR BA
TU_TestPort.h	Owned	1.0	PROVA_LIB:A11.A-SW_SRC;1.0	READY FOR BA
TU_TestPwm.c	Owned	1.0	PROVA_LIB:A51.A-SW_SRC;1.0	READY FOR BA

The bottom of the window shows a taskbar with the Start button and several open applications: Tedeschi - Microsoft..., D:\BITRON\NORME\5..., Microsoft PowerPoint..., and [New] Serena Dimens... The system tray shows the time as 11:34.

BITRON HAS DEVELOPED AN AUTOMATIC TEST BENCH USING NATIONAL INSTRUMENTS COMPONENTS IN ORDER TO EXECUTE:

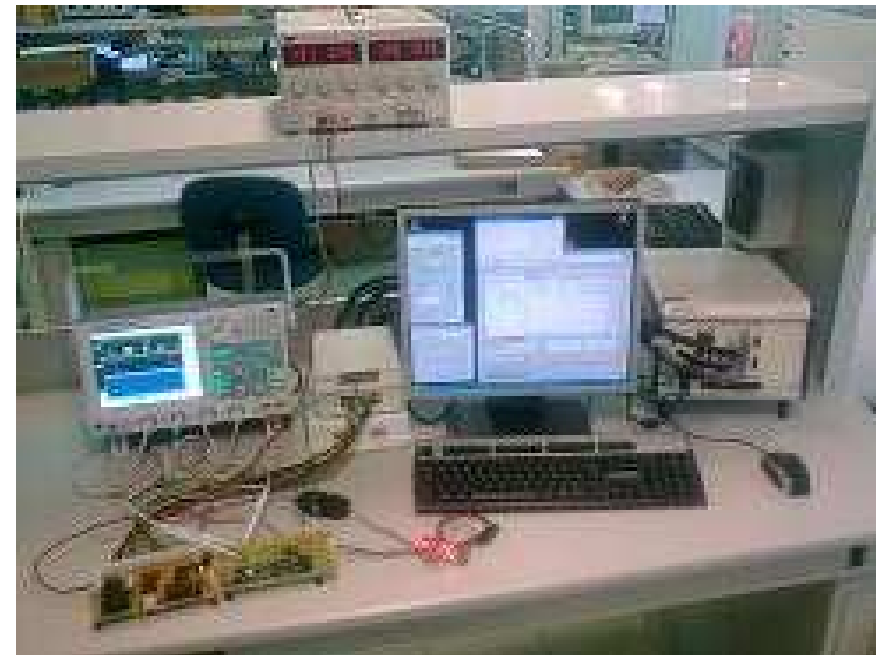
THE LIN TEST CASES PLANNED BY THE LIN CONSORTIUM

THE CAN TEST CASES (3rd Q. 2010)

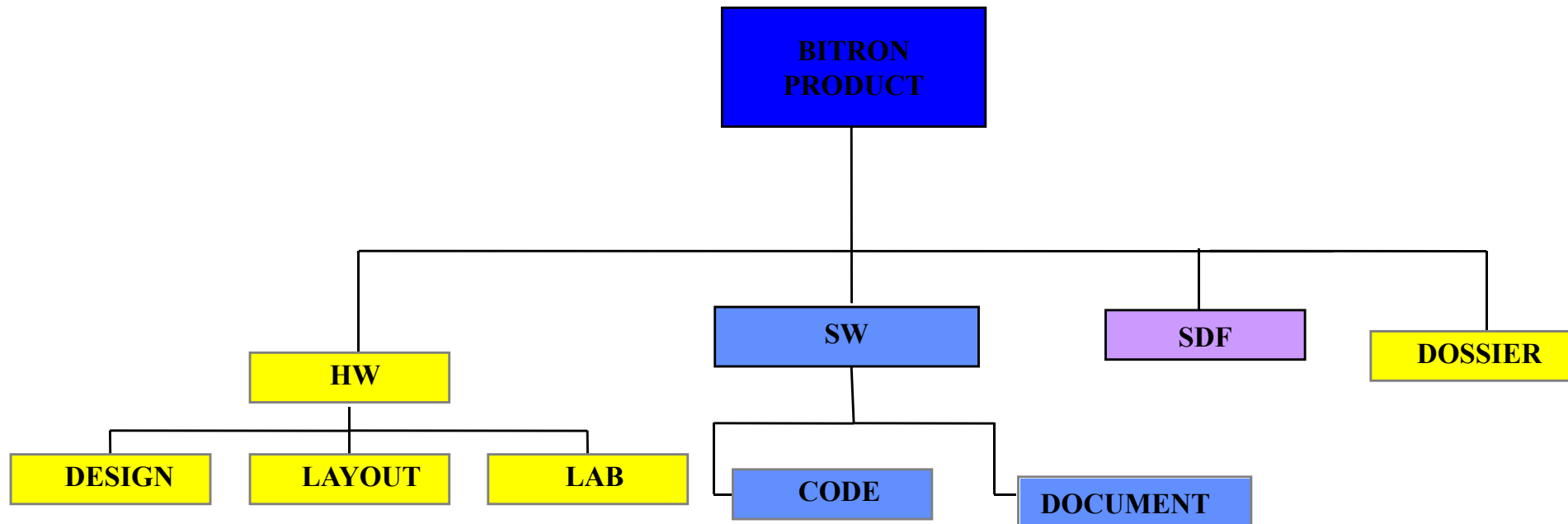
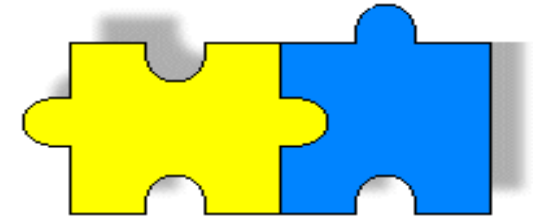
THE SPECIFIC TEST CASES OF THE APPLICATION

•
MAIN REQUIREMENTS OF THIS PROJECT ARE:

- TO BE ABLE TO EXECUTE TEST CASES IN A FAST, RELIABLE AND REPETITIVE WAY**
- THE CAPABILITY TO BE ADAPTABLE TO EVERY ECU IN SHORT TIME**
- THE CAPABILITY TO PROVIDE AUTOMATICALLY DETAILED TEST REPORT**
- THE CAPABILITY TO LOG EVERY BUS ACTIVITY**

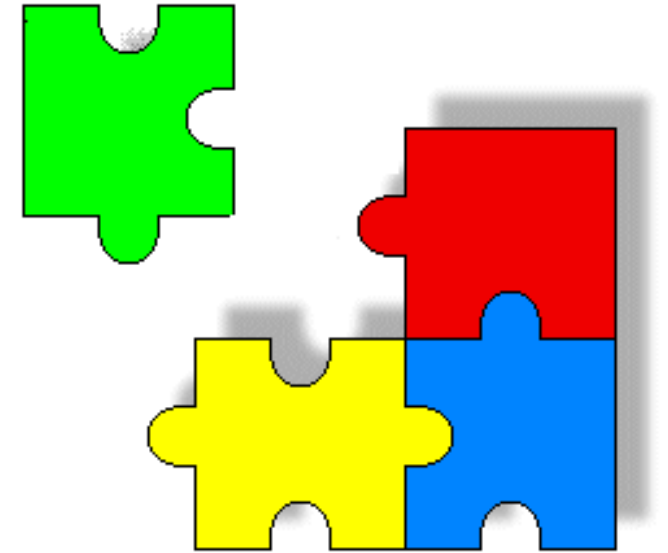


TO IMPROVE THE EFFICIENCY THE HW & SW PROJECT DOCUMENTATION IS JOINED INTO THE CONFIGURATION CONTROL AND THE COMMON DOCUMENTS ARE EXCHANGED AND MANAGED AUTOMATICALLY WITHIN THE TEAM

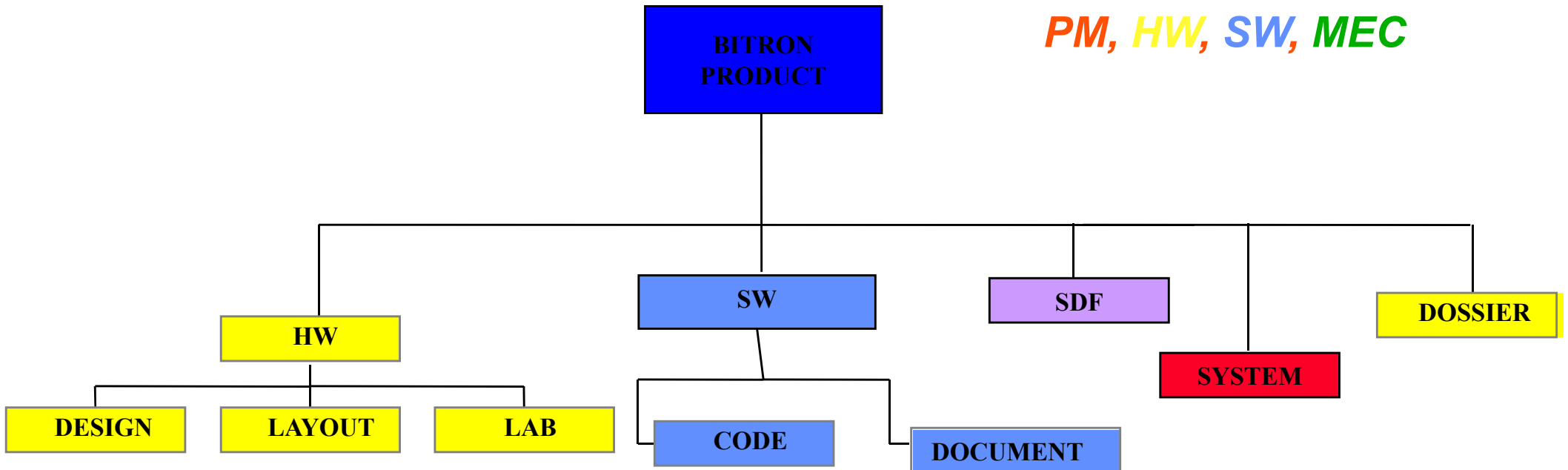


NEXT TARGET :

TO INTEGRATE ALSO THE ACTIVITIES OF THE PROGRAM MANAGERS AND MECHANICAL DESIGNERS SINCE THE EARLY PHASES OF THE PROJECT.



PM, HW, SW, MEC



CONCLUSION:

IN CASE OF A SMALL COMPANY THAT HAS TO COPE WITH SMALL PROJECTS, IT IS MANDATORY TO APPROACH'EM IN A VERY PRAGMATIC WAY.

A TAILORING OF THE PROCESS CAN BE A GOOD WAY TO REACH THE TARGET: THE RATIONALE OF THIS CUSTOMISATION MUST BE CLEAR TO ALL TEAM MEMBERS.

THE STRUCTURE OF THE ORGANISATIONAL UNIT MUST BE ABLE TO FOLLOW THE NEEDS OF THE INTEGRATED DEVELOPMENT.

SOFTWARE TOOLS AND AUTOMATION OF ACTIVITIES MUST BE APPLIED.



Thank you for your attention

Schiara Ugo

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