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**RoadMap** itSMF UK BCS

- **Agenda**
  - Purpose
  - C.E.S.A.R
  - SCM@CESAR
    - SCM Team Structure;
    - SCM Processes;
    - SCM Tools;
    - SCM Organizational Patterns;
    - SCM Scenarios;
    - SCM Traceability.

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**Purpose** itSMF UK BCS

- **Presentation Purpose**
  - Provide information about C.E.S.A.R's SCM infrastructure, processes and tools, as well as the variants of it.

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**C.E.S.A.R** iSMF UK BCS

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• **Who we are**

- C.E.S.A.R: Recife Center for Advanced Studies and Systems;
- **Non-profitable** organization;
- Founded in 1996 by federal university professors to bring **real world problems** to the academy;
- Focused in software **innovative** solutions;
- Use of an organizational process compliant with **CMMI3**;

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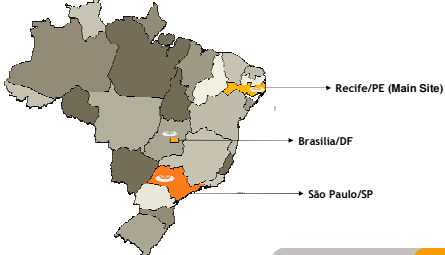
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• **Where we are**



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• **What we do:**

- Innovation;
  - Web applications (social networks, corporate solutions);
  - Mobile applications (games, corporate solutions, multimedia);
  - Digital TV applications;
  - Software Development Toolkits (Java SE and ME);
  - Software Test Design and Automation;

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## SCM @ C.E.S.A.R

- **SCM Team Structure**
  - 100% of software development projects are supported by at least one SCM specialist (a.k.a SCM Engineer or SCME);
  - Not all projects requires a full SCME allocation;
  - The SCME main responsibilities are:
    - Identify, plan and document the project configuration;
    - Control the changes (baselines);
    - Produce and delivery product releases;
    - Train and support development team;
    - Identify and implement automated procedures;

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## SCM @ C.E.S.A.R

- **C.E.S.A.R's Development Process**
  - CMMI3 certified organizational processes;
    - Staged Appraisal: CMMI3 in Sep/2007;
  - Sub-processes:
    - Configuration Management (SCME);
      - Plan Configuration;
      - Establish Baselines and Produce Releases;
      - Audit (Physical and Functional);
    - Change Management (development team);
      - Change Requests Control;

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## SCM @ C.E.S.A.R

- **SCM Processes**
  - Use of Eclipse Process Framework (EPF) Composer
    - Well documented;
    - Use of variability to describe project specific adaptations;
    - Process automatic website generation.



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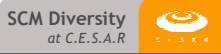
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## SCM @ C.E.S.A.R

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- **SCM Tools (Version Control)**
  - CVS
    - One the most popular version control tool. However, it lacks on permission control and branch structure.
  - Subversion
    - Designed to be CVS's replacement, SVN is achieving its goal. Improved permission control and branch structure, atomic commit, 'switch' command facilitates the use of branches.
  - IBM Clearcase
    - Very powerful and complete, for bigger projects. With Clearcase is easy to handle branch complex structures, due to Config Specs.



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## SCM @ C.E.S.A.R

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- **SCM Tools (Change Control)**
  - Mantis
    - Free popular web-based bug tracking and change request system.
  - IBM Clear DDTs
    - IBM solution for bug tracking and change request which can be tightly integrated with IBM Clearcase to manage changes throughout the development lifecycle.
  - GForge (Garage)
    - Open-source collaborative development environment and one of the features is bug tracking. It is used in C.E.S.A.R Garage projects.



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## SCM @ C.E.S.A.R

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- **SCM Tools (Build Automation)**
  - Apache Ant
    - Pure Java build tool, simpler and easier to use than GNU Make. There are some Ant "variations":
      - Cpptasks, C/C++ compilation tasks for Ant.
      - NAnt, free .NET build tool.
  - GNU Make
    - Build tool focused on C/C++ projects.
  - Bash Scripting
    - Shell Script tasks automation. Theoretically, what can be done manually in linux, can be reproduced via shell scripts such as Bash.



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## SCM @ C.E.S.A.R

- **SCM Tools (Build Management)**
  - **Cruise Control**
    - Continuous Integration pioneer tool focused on JAVA. Can be integrated with several version control systems and all configuration is made through XML files.
  - **Cruise Control .NET**
    - Continuous integration tool for the .NET platform. It is a C# port of CruiseControl for Java.
  - **LuntBuild**
    - Very complete and user-friendly tool. No configuration files, all jobs are done using web interface.

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## SCM @ C.E.S.A.R

- **SCM Tools (Project Website)**
  - **Drupal**
    - Flexible Content Management tool. There are several plugins available, to add new functionalities. It is mainly used at C.E.S.A.R to publish:
      - All releases
      - Baselines to be tested
      - CRs resolved
      - ...

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## SCM @ C.E.S.A.R

- **SCM Patterns**
  - Version Control Development: use of patterns described in Streamed Lines:
    - <http://www.cmcrossroads.com/bradapp/acme/branching/>
  - It was defined 3 basic branching schemes:
    - Simple;
    - Moderate;
    - Complex;
  - They can be adapted if needed;

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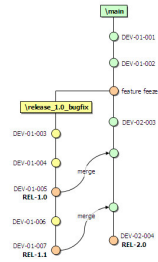
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## SCM @ C.E.S.A.R

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### • SCM Patterns

- Simple Branching Scheme:
  - Everybody commits in a single codeline;
  - Trunk might become unstable;
  - If two versions needs to be worked in parallel, a *feature freeze* is selected and a branch for stabilization is created;
  - Candidate for **continuous integration!**



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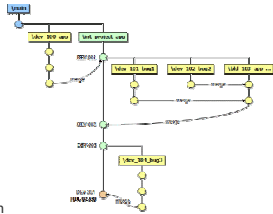
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### • SCM Patterns

- Moderate Branching Scheme:
  - Set of tasks per *development* branch;
  - Use of an *integration* branch to centralize the *official/stable* code;
  - Use of up-merges to update development branches;
  - In general **continuous integration** does not fit in this scheme;



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## SCM @ C.E.S.A.R

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### • SCM Patterns

- Complex Branching Scheme:
  - Base code;
  - Base code customizations;
  - Several integration branches;
  - Several levels of merging;
  - Parallel branches for a big development;

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**SCM @ C.E.S.A.R** iSMF UK BCS

• **SCM Patterns / Merge Techniques**

- Build Branches:

- Used when more than one branch needs to be integrated at once;
- A build branch is created by development team to resolve conflicts;
- Only the build branch is integrated;

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**SCM @ C.E.S.A.R** iSMF UK BCS

• **SCM Patterns / Merge Techniques**

- Up-Merges:

- Used when integration branch is updated faster then development branch;
- Development branch must catch-up before integration;

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## SCM Traceability @ C.E.S.A.R

- **Keep traceability is not trivial.**
- **Solution:**
  - Use functionally integrated development suites.
- **Some Benefits**
  - Which test cases covers each requirement?
  - Which test cases are going to be impacted in my change?
  - Which use cases are going to be impacted in my change?

```

graph TD
    Req[Requirements] <--> TC[Test Cases]
    UC[Use Cases] --> Req
    UC --> TC
    SC[Source Code] --> UC
    Ch[Changes] --> SC
    CR[Code Review] --> Ch
    
```

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## SCM Traceability @ C.E.S.A.R

- **Requirements x Requirements (ITReq)**
  - Which requirements are dependents and conflicting?
- **Requirements x Test Cases (ITReq)**
  - All test cases associated to a requirement, will be mapped.
- **Change Requests x Req. X Test Cases (Mantis)**
  - To every CR, we have to map the impacted requirements (CCB analysis)
  - Given a certain change we can have the following information
    - What test cases do i need to execute because of my change?

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## SCM Traceability @ C.E.S.A.R

- **Change Requests x Peer Reviews (Rev.I.S.E)**
  - Ability to recover all review records regarding a certain Change Request.
  - Assure that (before closing a CR) all artifacts related were reviewed.
- **Change Requests x Commits (CVSGuardian)**
  - Every change in the repository will be associated with a CR.
  - We now know what files in the repository were changed due to a CR.

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**SCM Traceability @ C.E.S.A.R**  

- **ITReq**
  - Developed on top of Mantisbt Platform
  - Open-Source (GPL) as Mantis
  - It will be "released" to open-source community on August/2008
  - Purposes and Characteristics:
    - Manage and Track Requirements and UseCase.
    - No More Word Documents! ☺
    - Automatic web document generation.
    - Support Requirements Relationships.
    - Interface similar to Mantisbt.
    - Support to a Status Machine.

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**SCM Traceability @ C.E.S.A.R**  

**ITReq** 

Dedicated Mantis for Requirements Tracking

Logged in as: [G2] (Guan Albuquerque - administrator) 2008-06-25 15:35 GMT Project: All Projects

[My View](#) | [Search](#) | [New Requirement](#) | [Summary](#) | [Manage](#) | [My Account](#) | [Good Practices](#) | [Print](#) | [Logout](#)

Recently Viewed: [0]


DRAFT | DONE | REWORKED | REVIEWED | APPROVED | ABORTED

Requirements Status Percentage

9%	4%	63%	18%	6%
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Unassigned [ ] (1 - 10 / 246) | Reported by Me [ ] (0 - 0 / 246)

0354	Deploy an application to the mobile handset on [SWT] / [M2U] Tools - 2008-06-20 15:35	<input checked="" type="checkbox"/>
0371	J2E 180 - Overview [SWT] / [M2U] Documentation - 2008-05-06 14:57	<input checked="" type="checkbox"/>
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0368	Features Tier 1 and Tier 2 (General) [SWT] Studio - 2008-04-30 16:43	<input checked="" type="checkbox"/>
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0366	Studio's feature version update [SWT] Studio - 2008-04-30 16:10	<input checked="" type="checkbox"/>

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**SCM Traceability @ C.E.S.A.R**  

REQUIREMENTS DOCUMENT

WMA Server



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REVISION HISTORY

Version	Date	Author	Description	CR
01.00	24/01/2008	Gustavo de Paula	Closest Version	

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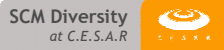


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## SCM @ C.E.S.A.R

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- **SCM Scenarios**
  - Depending on the project needs, a set of tools and procedures is suggested:
    - Projects that needs a high quality and traceability needs requires a complex branching scheme and thus, the continuous integration is not applicable;
    - Regular Projects requires a certain agility, but still a bigger control and traceability is needed;
    - Fast agile projects requires continuous integration and a straightforward VCS tools (CVS/Subversion);
  - Other Adaptation according to project needs is possible.



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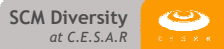
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## SCM @ C.E.S.A.R

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- **SCM Scenarios**
  - **High Quality Projects**
    - IBM Clearcase, Mantis, ITReq, REV.I.S.E.
      - Traceability is a must.
    - Several Integration Branches
    - One development branch per CR
      - All changes are isolated in one branch per CR to increase traceability.
      - Constraints Continuous Integration.
    - Full control procedures
      - All audits and activities applies to this scenarios.
    - Generally the SCME allocation (%) is higher.



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## SCM @ C.E.S.A.R

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- **SCM Scenarios**
  - **High Quality Geographically Distributed Projects**
    - Extension of the “High Quality” scenario with geographically distributed scenario;
    - IBM Clearcase Multi-site;
    - Inclusion of verification steps;
    - Code Integration between different sites.
    - Management efforts increases in order to manage communication among sites.



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**SCM @ C.E.S.A.R** ITSMF UK BCS

• **SCM Scenarios**

- **Regular Projects**
  - CVS/Subversion, Mantis, CVSGuardian
    - Change Requests x Commits;
  - One integration Branch
    - Change are generally made in a separated communitarian branch;
    - Constraints Continuous Integration;
  - (Almost) Full control procedures
    - Since the whole traceability is not applicable, some of the verifications and audits are not applicable as well.

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**SCM @ C.E.S.A.R** ITSMF UK BCS

• **SCM Scenarios**

- **Fast Agile Projects**
  - CVS/Subversion, Mantis, CVSGuardian
    - Change Requests x Commits;
  - Simple branch scheme
    - Continuous Integration is highly applicable using Luntbuild;
  - Allocation is very often smaller than other projects
  - On-the-fly SCM Activities.

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• **Summary Conclusion**

- Traceability and automation is a matter of life ☺
  - Automation is totally needed in order to achieve full traceability.
- Due to clients and budget constraints a variety of SCM environments needed to be created.
  - EPF supports the process variability.
- In spite of the diversity needed, all projects run without any difficult.

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