

# THE SOFTWARE USE FOR VERSION CONTROL AS A SUPPORT TOOL FOR THE PRODUCTION OF INSTRUCTIONAL MATERIALS OF DISTANCE EDUCATION – DE

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## **SUMMARY**

*The use of the versions control systems presupposes to understand how works its structure, looking for standardizing the involved concepts, making even the team training easier. Most of the basic aspects apply to the several types of tools found in the market. So, it is important to understand the working logic of these systems, the use of the "Subversion" software for version control and the applicative of auxiliary graphic interface of "TortoiseSVN" - both free tools - to manage material versions and other learning objects developed in DEC/Ifes' material production sector. The main results were the cataloguing of the materials and learning objects and the decrease of rework and mistakes in the didactic material production sector.*

**Key words: Version Control, Material Production, Configuration Management, Audit.**

## 1. Introduction

Producing materials for Distance Education (DE) is a complex activity that demands a high level of organization of people involved in the process. Usually, there happen many interactions and changes in the material until it be considered appropriated to use. This is true, especially in the productions of printed materials, which demands a deeper analysis and as consequence of this, there are created several other requirements as image production, text review, and layout development, among others.

The Distance Education Center of Federal Institution of Espírito Santo (DEC/Ifes) defined a process of production for the printed material. The Picture 1 presents the main stages of this process.



Picture 1: Part of the printed material production process.\*

### \*Subtitles:

Envio do material pelo professor: Material sent by the professor.

Revisão do designer instrucional: Instructional designer review.

Revisão do Pedagogo: Pedagogue review.

Ajustes do professor: Professor adjustments.

Revisão de textos: Text review.

Diagramação e finalização: Layout development and closing.

After elaborating the didactic material based on the activity map, the content teacher sends his first version to de instructional designer. The designer inserts several comments and suggestions. After that, the pedagogue adds the comments relevant to his field. Then, the professor modifies the material, considering the instructional designer and the pedagogue ideas. After this process, the material is sent to the text reviewer for the corrections and then the professor

makes the last adjustments. Then, the version of the file is sent to a specialized company to develop the layout and finish the material.

It is possible to notice by the process that the material is modified many times and by people performing several roles. Controlling versions is something really challenging. Many e-mails are sent, received and filed. In case of some version gets lost, the final result gets seriously compromised. On the other hand, saving many documents of the same material compromises the file servers and makes a mess, demanding the team a lot of time to organize the directories. These problems can lead to many troubles such as: incompatibility among work teams, inconsistencies, rework, delay in the delivery and students' dissatisfaction [1].

This paper aims the use of the "Subversion" software of version control and the TortoiseSVN, applicative of auxiliary graphic interface - both free tools - to manage the version of materials and other learning objects developed in the DEC/Ifes production sector.

## **2. Tools of version control**

The use Version control systems presupposes to understand how works its structure, how to standardize the concepts involved making, even the team relationship, easier. Most of the basic aspects are used in the several types of tools found in the market. So, it is important to understand the logic of working of these systems.

The version programs work with the repository concept. A repository is a central spot where the main copies of all the versions of work files are stored [2]. So there is, usually, a server machine to store it. It must be safe and a security copies of the files must be done periodically.

The user doesn't work directly on the files of the repository. Instead, he uses a work area/copy that has the copy of the project files and it is monitored to identify the changes made (modification control). This area is individual and isolated from the other work areas.

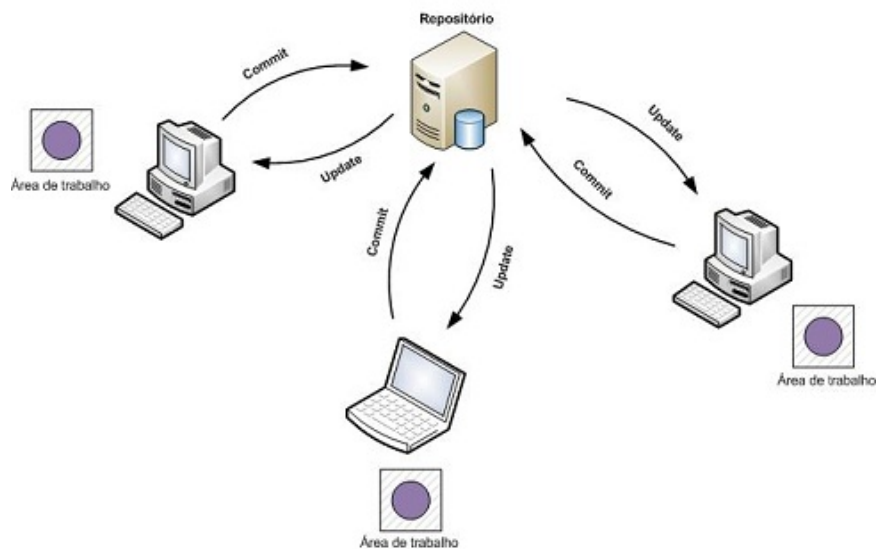
When alterations are made in the work copy, it needs to update the versions in the repository. The opposite is also true: to work with security, it is

necessary to have the most updated version of the repository files in the local work copy.

The synchronization between the work area and the repository is made by the “commit” (or check in) and “update” (or check out) commands [5]. The “commit” sends a package containing one or more modifications made in the work area (origin) to the repository (destination). The update makes the inverse, so it sends the modifications contained in the repository (origin) to the work area (destination).

Each "commit" creates a new review in the repository, containing the modifications made, date and author (version control). A review works as a "photo" of all files and directories in a particular moment of the project evolution [6]. The old "photos" will be kept and can be recovered and analyzed at anytime (configuration report). The group that forms these reviews is, precisely, the project history.

The picture 2 summarizes the working scheme of the version control systems.



**Picture 2:** how it works a version control system.\*

**\*Subtitle:**

Área de trabalho: work area.

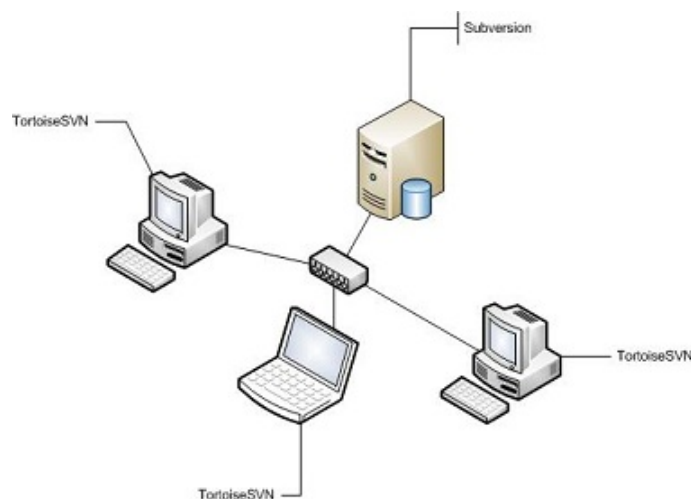
The triad history, collaboration and variation in the material development are the main directives to have, effectively, a version control. The history records all

the work evolution, each change on each file. With this information it is possible to know who does what, when and where. Besides, it allows reconstructing a specific review of the file at anytime. The collaboration enables many people to work in parallel on the same files. The directive variations of the material development keep different evolution lines of the material, allowing the access to several versions of a particular material.

### 3. Use of *Subversion* and *TortoiseSVN* at DEC/lfes

With the aim of organizing its production of didactic material and learning objects, the DEC/lfes chose the use of TortoiseSVN [4] and Subversion [3]; [7] to control versions, because they are free, used by many and documented tools.

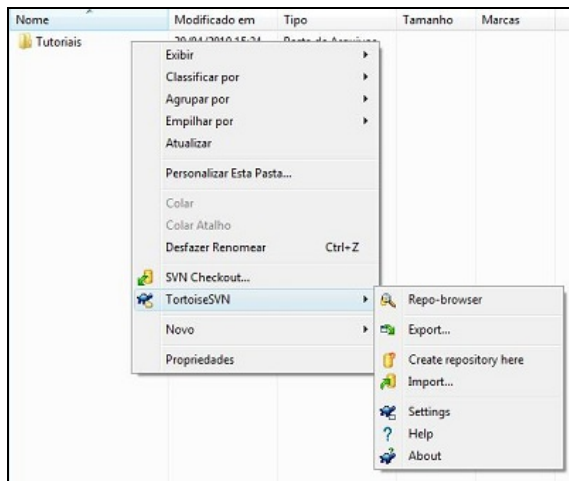
The TortoiseSVN (<http://tortoisesvn.net/>) is an applicative for the (<http://subversion.apache.org/>) software. The TortoiseSVN helps the user with the version control of his files and directories, by a simple and intuitive interface. It runs in the client's machines. The Subversion is the one that controls the version and runs in the server. The picture 3 shows the interaction between Subversion and TortoiseSVN.



**Picture 3:** - interaction between Subversion and *TortoiseSVN*

After installed, the TortoiseSVN integrates itself to the Microsoft Windows operational system, making easier the use of it. The picture 4 shows the use icons on the pop-up menu when the user clicks with the right button in any folder on the

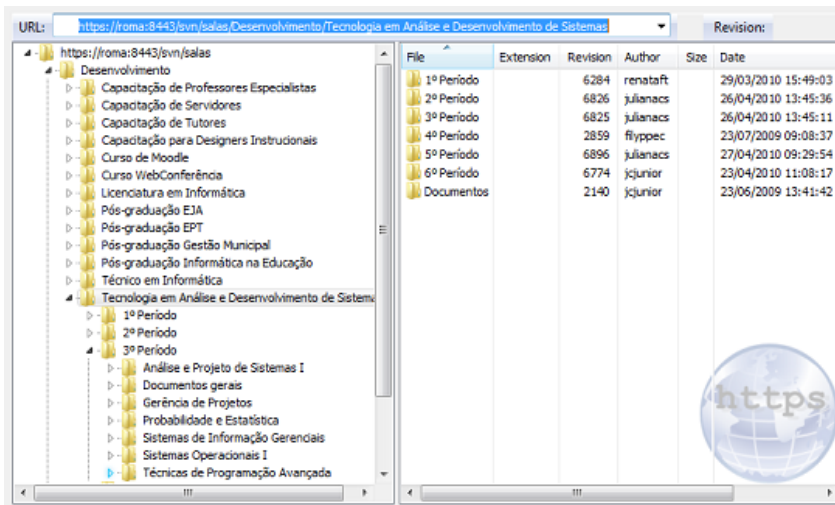
computer.



**Picture 4:** TortoiseSVN functionalities integrated to the Windows operational system.

For the use of the system, it was necessary to rearrange the directories, so the repository was organized and with clear understanding. The choice was to create a directory for each course offered by DEC/Ifes. Inside the courses directory, it was organized according to semesters and disciplines. The picture 5 presents a general view of the files repository.

It might observe that the course "Technology in Analysis and Development of Systems" is divided in six semesters. Each semester has its disciplines. In the picture, it is possible to visualize the directories for the third semesters of the course. The picture 6 shows an organization for a discipline, for which are created the subdivisions according to the type of produced objects.

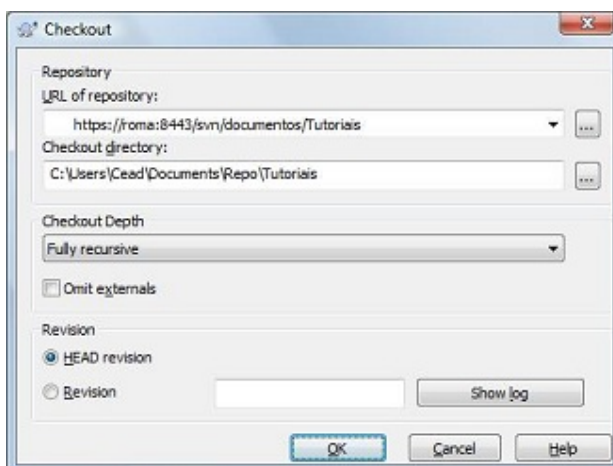


**Picture 5:** File repository organization.

File	Extension	Revision	Author	Size	Date
Animações		478	jcjunior		27/05/2009 15:20:44
Documentos		3512	jcjunior		03/11/2009 13:43:59
Imagens		3217	julianacs		05/10/2009 14:21:06
Tutoriais		474	jcjunior		27/05/2009 15:20:03
Vídeos		474	jcjunior		27/05/2009 15:20:03

**Picture 6:** Discipline directories organization.

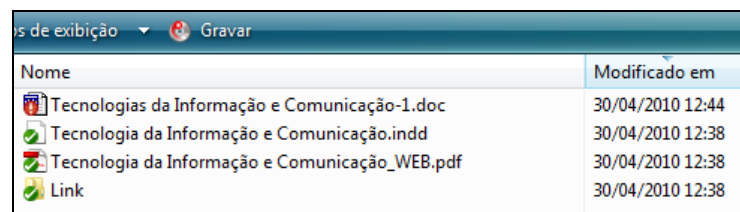
To change any repository file, it is necessary to create, locally, the work area. To do that, the TortoiseSVN allows the user to choose the local in the machine that will store the copies of the repository files. The picture 7 illustrates this process:



**Picture 7:** Downloading repository files to the client's machine.

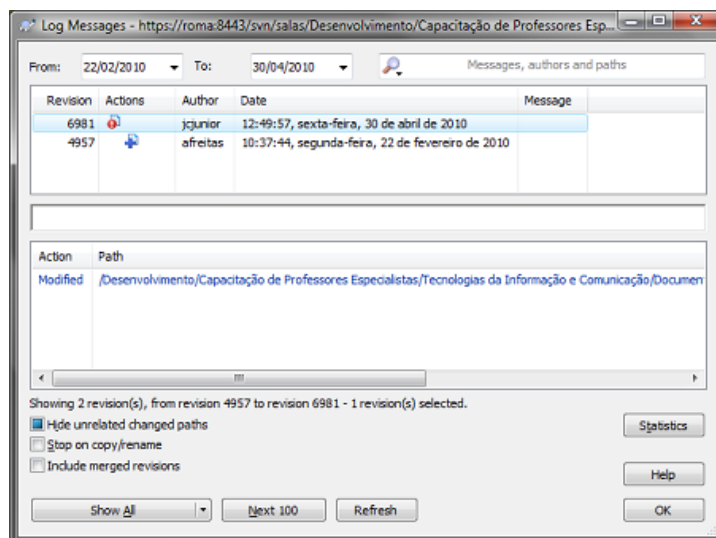
After this process, the local work directory will be connected to the repository. The files with the green icon on the traditional icon of the operational system are updated with the repository. It means that they are most updated versions. Now, the red icons signalize that the file is locally modified, but not in the repository. So there is the necessity of using the "commit" command, updating the file in the repository and creating a new version of it.

The picture 8 shows an example of files with indications of version control.



**Picture 8:** Local files with indication of repository synchronization.

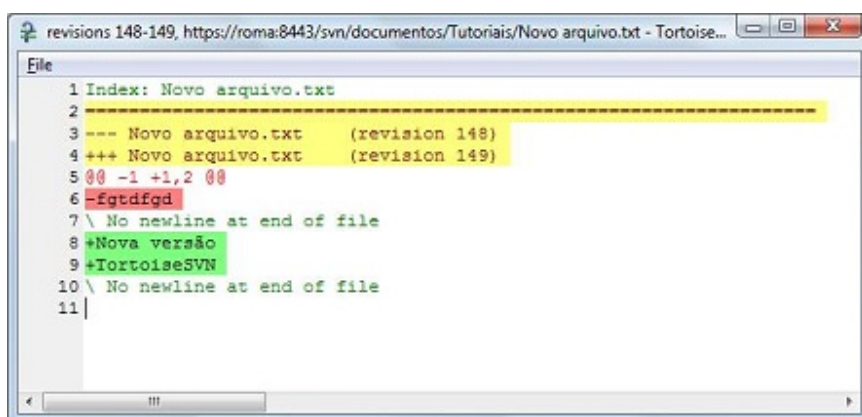
A very useful resource of TortoiseSVN is the review report. It is possible to visualize all the modifications made in a particular file, who made them and when. It is also possible to have an older version to the new edition or a simple check. In the picture 9 there is a modifications log (record) in a file that is in its second version.



**Picture 9:** Review report of a file under version control.



For an even deeper analysis about differences between versions, the TortoiseSVN allows the user to compare the files content, highlighting the differences between one and other. So, it is possible to know exactly which were the modifications, made by a user, in a file. It is important to highlight that this resource, in spite of being very helpful, is not applicable to all kinds of file. The picture 10 shows a text file under analysis, with colors pointing each modification.



```
revisions 148-149, https://roma:8443/svn/documentos/Tutoriais/Novo arquivo.txt - Tortoise...
File
1 Index: Novo arquivo.txt
2 -----
3 --- Novo arquivo.txt      (revision 148)
4 +++ Novo arquivo.txt      (revision 149)
5 @@ -1 +1,2 @@
6 -Egtdfgd
7 \ No newline at end of file
8 +Nova versao
9 +TortoiseSVN
10 \ No newline at end of file
11 |
```

**Picture 10:**Review analysis in a text file.

In this section only some main functionalities of the TortoiseSVN as a graphic interface of Subversion were presented. There are many others that allow an accurate version control. However, those ones pointed above, are the most used in the daily tasks of DEC/lfes production and already provided great facilities in the organization of the didactic material.

#### **4. Results and Future Works**

The Subversion and TortoiseSVN implantation allowed to catalogue the materials and learning objects produced at DEC/lfes. That decreased the rework of the material production team, now that the repository is always consulted in each new material production requirement. If already there is material that attends to the requirement, it can be reused or even adapted, what minimizes the effort of a new production.

The average of mistakes caused by works in inappropriate versions decreased drastically. That was a relevant fact, now that the routing of an

inappropriate version for printing causes a problem practically incorrigible when it talks about cost.

Nowadays, about twenty five employees from the material production sector are using the version control. It is important to highlight that there were difficulties in the beginning of the use of TortoiseSVN by some members of the team. However, after instruction manuals were developed and enabled and the training sections for the users, the use of the system got stabilized without bigger problems.

About future works, it highlights the necessity of integration with the server of user confirmation. So, if the person makes a confirmation on the initial screen of the operational system, there wouldn't be necessary to confirm again to use the repository of the version control, which happens nowadays. That is to say, the users' base would be unified.

It also has the prevision of expansion of the version control use for all the DEC/Ifes and not only in the production of didactic materials, making also possible the follow-up of modifications in the administrative documents and others.

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