

# SOFTWARE CONFIGURATION MANAGEMENT

Course Code : SWE2021

Slot : A2

## Digital Assignment - 1

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Comparative study on various SCM tools in the market.

### **1. Ansible Configuration Tool :**

Ansible is the best configuration management, deployment, orchestration open-source tool and also automation engine.

It is a push-based configuration tool. It helps to automate the entire IT infrastructure by providing large productivity gains. Ansible generally connects through SSH, remote PowerShell or via other remote APIs.

- Developed By: Michael Dehhan  
Initial Release : 2012  
Stable Release : 2.6.2 version
- Based on Language : Python and PowerShell  
Operating Systems : Linux, Unix, Windows, MAC OS

The feature of Configuration Tool Ansible:

- Agentless means no need for agent installation and management.
- Uses SSH for secure connections.
- Follows push-based architecture for sending configurations so that the user can control the changes made on servers.
- Ansible can be idempotent if written carefully.

- Minimal Learning is required.

#### Pros:

- Ansible is based on SSH, so it doesn't require to install any agents on remote nodes.
- Ansible playbook structure is easy and crystal clear structured.
- Ansible has a more streamlined codebase compared to some other tools.
- Ansible is idempotent.
- It has high interoperability.

#### Cons:

- Ansible is less effective than other tools that are based on other programming languages.
- Ansible does its logic modification through the DSL, that means checking in on the documentation consequently until you learn it
- In Ansible variable registration is asked for even simple functionalities, which converts easier tasks into more complicated
- Ansible introspection is really very poor, so it makes tough to see the values of variables within the playbooks.
- Poor development testing.

## **2. SALTSTACK Configuration Tool :**

SaltStack is also a configuration tool that works on a master-client setup model or a non-centralized model. SaltStack is based on Python programming language, SaltStack provides a push and SSH methods to communicate with clients. SaltStack allows to group together clients and configuration templates to take control of the environment simple and easy.

- Developed By : Thomas H Hatch

Type : Open Source

Stable Release : 2018.3.2 version

Based on Language : Python Programming Language

Operating Systems : Unix, Microsoft Windows, OS X

Saltstack Features:

- Salt Cloud integrates with many other cloud providers like Google Cloud, AWS, etc. so it's easy to take benefit of all the assets with one command.
- Saltstack has minions that can check files, processes also host other things.
- With orchestrate in bucket Saltstack deploys a complex application by executing single-line commands.

Pros :

- It is simple, Straight and usage is easy once you go through the setup phase.
- Saltstack has a DSL feature so it doesn't require logic and states.
- Saltstack's Input, output, and configs are very stable and consistent because it uses the concept of YAML.
- The introspection feature plays a handy role as it makes simple to look at what is happening inside Salt.

Cons :

- The first installation process is really difficult to set up and make tough for new users to understand.
- Support for non-Linux Oss is not that great.
- Refer Below Screen Shot of SaltStack

### **3. RUDDER**

The rudder is one of the famous and most used open-source, web-driven, role-based solutions, configurations, and audit management tools to make automated system configuration across huge IT organizations and compliance. Rudder depends on a light local agent which are installed on each and every managed system. Rudder's server-side web interface is built by Scala language and its local agent is written in C language.

Rudder mainly has two functions:

- Configuration Management
- Asst Management
- Developed By : Normation

Type : Open Source

Stable Release : 4.3.4 versions

Based on Language : Scala (server) and C (agent)

Operating Systems : Unix, Microsoft Windows, Android, Ubuntu

Features of Rudder:

- Rudder Tool provides Web Interface to manage the nodes and also define policies.
- Rudder hosts the inventory part.
- Rudder provides a custom policy editor, which is very unique.
- Rudder automates the simple tasks of administration like installing or configuring.
- Rudder supports FULL REST API to communicate with Rudder Server.
- The rudder has GIT in its backend.
- Rudder dynamically generates each host policy.

Pros :

- Best performance

- The rudder is based on CFEngine standard so inherits some functionalities of CFEngine
- It provides automated inventory for hardware and software both
- It provides graphical reporting
- It has the best practices library included

Cons :

- Rudder community is growing but not very big on this day like the puppet, Ansible, etc.
- Rudder is overkill if the goal is only to push one-time actions.

#### **4. Bamboo Configuration Management**

Bamboo is one of Atlassian's continuous delivery and releases management tools. Bamboo offers a high standard of support for regular delivery. Bamboo gives output as a single flow. Bamboo provides developers, testers, build engineers, and system administrators a common shared space to work and share information storing sensitive operations like production deployment and security.

- Developed By : Atlassian  
Type : Open Source  
Head Quarters : Lindon, USA  
Stable Release : 6.6 versions  
Based on Language : Java Programming Language  
Operating Systems : Cross-Platform as based on Java

Features of Bamboo Tool:

- Bamboo is basically a tech-stack as it is suitable for any language and other big technologies like AWS, Docker, etc.

- Bamboo provides justice to the deployment of projects and environments.
- Bamboo provides dedicate agents feature, with the help of which user can run hotfixes and critical builds right away and there is no need to wait for it.

Pros :

- With the use of Bamboo gives better and improved CI/CD.
- Bamboo supports Dev + Ops means from integration to deployment to delivery
- Bamboo can hook with SVN and in this manner, provides full SCM support.
- Bamboo supports GIT.

Cons :

- Bamboo has no scope for inheriting project structure, as a result, it becomes a tough task to define behavior for each and every module.
- Poor Documentation for installation and tough for the new user to understand.
- Bamboo doesn't support the passing of properties.
- Bamboo doesn't support the concept of build promotion.

## **5. TeamCity Configuration Tool :**

TeamCity is also one of the management and continuous integration server developed by Jet Brains and based on Java Programming Language.

Released on 2<sup>nd</sup> October, TeamCity provides up to 100 build configurations (jobs) and run unlimited builds. Concurrently it runs 3 agents and if needed it to add extra also. It possesses a public bug tracker and forum open to all the users. It's open-source so free for all users.

- Developed By: JetBrains

Type : Open Source

Stable Release : 2018.1 versions

Based on Language : Java Programming Language

Operating Systems : Server-based web application

Features:

- TeamCity provides technology awareness.
- TeamCity has a configuration feature that avoids code duplication.
- TeamCity version control system is comprehensive.
- TeamCity provides support for integrations.
- TeamCity supports build history.
- TeamCity helps you with multiple ways of interaction, customization, and extending your server.
- Cloud integration functionality is also supported.

Pros :

- TeamCity is a feature-rich toolset.
- TeamCity has many developer-oriented features.
- TeamCity doesn't require any additional plugins.
- There are more than 100 features in TeamCity.
- TeamCity allows you to grow and move smoothly.

Cons :

- TeamCity restricts you in terms of different kinds of projects according to its base plan especially build configurations.
- It may take time for a new user to get acquainted with the project hierarchy structure of it.

## **6. Octopus Deploy**

Octopus is one of the famous configuration tools which takes you beyond the limit where your Continuous Integration server ends.

Octopus Deploy helps you enable automation even for the most complex application deployments, whether the application is on-premises or in the cloud, it will not be an issue.

- Developed By : Paul Stovell

Type : Open Source

Head Quarters : Indooroopilly, Queensland

Stable Release : 2018.7.11 versions

Based on Language : Java Programming Language

Operating Systems : Server-based web application

Features Of Octopus Deploy Configuration Tool:

- Octopus provides fast, repeatable and reliable deployments.
- Octopus can promote release between environments.
- Through Octopus Deploy complicated deployments are made easy.
- Intuitive and simple so easy to use its user interface.
- Easy to start with.
- Octopus provides world-class platform support like ASP.NET, JAVA, Node.js, many scripting languages, databases, and other platforms.

Pros :

- Octopus Deploy is developed to possess a very powerful and flexible deployment process.
- It provides seamless integration.
- Gives users massive permission when comes to granularity.
- Provides a good and managed audit sections for deployments.
- Application and database deployments are really executed in a smiling manner through the life cycle.

Cons :

- For new users, the tool can be confusing as it has so many options.
- As multiple environments can be accessed the UI gets ramped up.



- It can be improved on with AWS integration.
- Sometimes it gets difficult to understand the code repo.
- Octopus has to manually installed on each hosted machine which is a very time taking and boring task, something should be done about it.

## **7. CHEF Configuration Tool :**

The chef is basically an automation platform that provides a way to configure and manage infrastructure. Infrastructure as code implies executing by coding rather than doing manual execution. The chef works on Ruby and DSL for writing the configurations.

- Developed By : Adam Jacob

Type : Open Source and Enterprise available

Head Quarters : Seattle Washington, USA

Stable Release : 14.2.0 version

Based on Language : Ruby and Erlang

Operating Systems : Linux, Unix, Windows, AT&T Unix, Mac OS, IBM AIX

Pros:

- Chef follows the Push model and allows cloud adoption.
- Chef helps to increase service resiliency, to develop more defect-free software as it captures bugs before they occur.
- Chef Helps to improve risk management. Chef's automation abilities are able to lower risk and improve compliance at all stages of development.

Cons :

- Chef tool is forced into Ruby
- some workflows in Chef seem a bit convoluted as code bases become huge

- The chef doesn't support the push functionality.

## **8. Puppet Configuration Tool :**

Puppet is an open-source software configuration management tool. It is used for deploying, configuring and managing servers. It uses a master-slave architecture.

Configurations are pulled from the master by the nodes.

- Developed By : Luke Kanies.

Type : Open Source

Head Quarters : Portland, USA.

Stable Release : 5.5.3 version

Based on Language : C++ and Clojure

Operating Systems : Linux, Unix, Windows

Prominent Features :

- Reporting and Compliance i.e. gain real-time visibility into the state of your infrastructure.
- Event Inspection
- Automated Provisioning
- Get enterprise support all-day
- Orchestration

Pros :

- Puppet has Strong compliance in automating and reporting tools.
- Puppet provides active community support across development tools.
- Puppet provides Intuitional web UI to handle multiple tasks, which includes reporting and real-time node management.

Cons :

- Initial understanding could be tough for new users who should learn

Puppet DSL or Ruby, as advanced and real-time tasks eventually require input from CLI.

- While installing the Puppet process lacks adequate error messaging.
- Puppet support is more priorities toward Puppet DSL over pure Ruby versions.
- Puppet Lacks revert system, so there is no immediate action on changes.

## **9. ConfigHub**

ConfigHub helps teams manage, secure and deliver configuration across the entire stack. The tool allows you to store, manage and distribute software configuration for a single application or a distributed system.

ConfigHub is a software configuration platform for distributed and microservice driven applications.

ConfigHub helps IT teams secure, manage, and deliver configurations across a whole stack. Developers can store, manage, and distribute software configurations for either a single application or an entire distributed system. ConfigHub is particularly good at dynamic modeling for system topologies, eliminating config errors and duplication, and centralizing all configuration control in one place. Cost: Open-source.

Key Features:

- When config is included with code, changes are almost always made by the developer, and the same changes must be applied in multiple places.
- There is no disk data that can be used, searched, or filtered.
- ConfigHub eliminates duplication of files and key values by using context. Zero duplication means fewer errors and a lot of time savings.
- ConfigHub has developed world-class support for dynamic configuration contexts, separating application instances from their

required configuration data, leading the way in generating host-independent system topologies.

Features:

- Eliminate config duplication and errors
- Dynamic modeling for any system topology
- Helps you to control all config from one place

## **10. Alibaba Application Configuration Management**

Application Configuration Management, which is also known as ACM. It allows you to centralize the management of application configurations. The tool enhances service capabilities for DevOps, Big Data and Microservices. Application Configuration Management (ACM) allows you to centralize the management of application configurations. This makes for more convenient management of configurations and enhances service capabilities for such scenarios as microservices, DevOps, and big data. ACM's predecessor was Diamond, the internal configuration center for Alibaba's Taobao.

Benefits :

- Security and Compliance.  
Separates sensitive information from application code and running environments. Encrypts the configurations to secure the configuration information.
- Advanced Version Management.  
Provides functions such as quick rollback, modification audit, and push logs
- Real-time Configurations.  
Supports configuration monitoring. Configurations are synchronized within seconds to ensure consistency in a large distributed environment.

- High Performance and High Reliability.

Provides a multi-level cache service and ensures 99.99% server availability to enable disaster recovery on the client. Your business is not affected by service interruptions.

- Phased release
- Throttling and downgrading
- Dynamic routing

Features :

- Separates sensitive data from application code and running environments.
- Offers real time configuration for your environment.
- Offers multi-level cache service and ensures 99.99% server availability
- Supports push log for configuration during the entire life cycle.
- Supports version management

## **11. Tortoise svn configuration tool:**

TortoiseSVN is a popular SVN client that is used to communicate with the SVN server.

It is a revision control, version control, and source control software for windows. It is based on a top Apache product 'Subversion'.

It provides a splendid and easy user interface for the SVN.

It is developed under the GPL (General public license), which means it is open-source and free. The source code of the SVN is also available, so we can also develop our version.

Since it's not an integration tool for the IDE's like Eclipse, Visual Studio, or others, we can use it with any development tools we like, and with any file.

**Tool type :**

- It is a Open Source software.

**Modules :**

- It has different module like changing the version control, change management and making proper audit whit the help of date and time etc.

**Version :**

- The current stable version, I am using is 1.14

**Notable features of the tool :****Features of TortoiseSVN**

- It is easy to use.
- All commands can be performed directly from the window explorer.
- It allows us to move files by dragging and dropping from the window explorer.
- It supports all SVN protocols.
- It has a robust commit dialogue.
- It provides a flexible mechanism to integrate it with any web-based issue tracking system.

**Installation Requirements :**

- It does not require a lot of memory to install it just require 70-80MB of space.
- But the tortoise svn runs on Windows Vista or higher and is available in both 32-bit and 64-bit flavours. The installer for 64-bit Windows also includes the 32-bit extension parts. Which means you don't need to install the 32-bit version separately to get the TortoiseSVN context menu and overlays in 32-bit applications.

## Installation Process and Demo :

Installation of TortoiseSVN is a straight forward process. Below are the required steps to install it.

First of all, we need an installer file like below :

for 32-bit OS

TortoiseSVN 1.14.2 - 32-bit

for 64-bit OS

TortoiseSVN 1.14.2 - 64-bit

for 32-bit OS

TortoiseSVN 1.10.5 - 32-bit

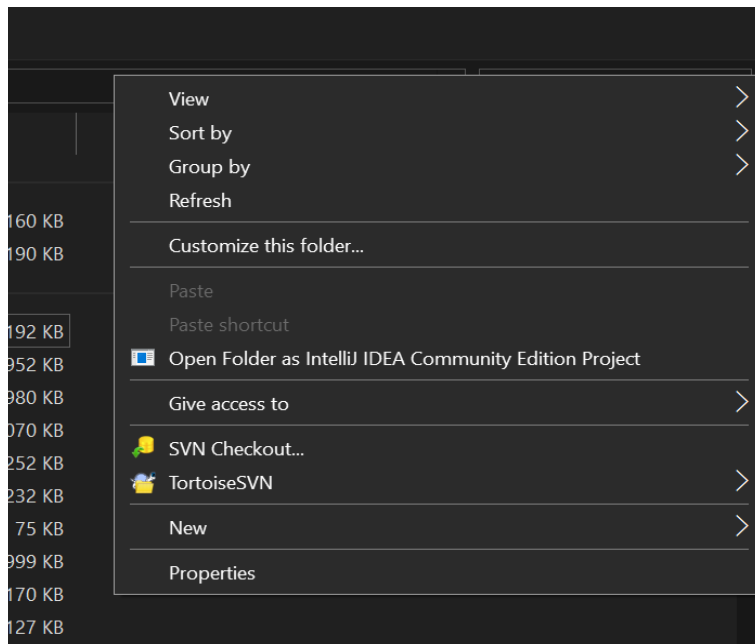
for 64-bit OS

TortoiseSVN 1.10.5 - 64-bit

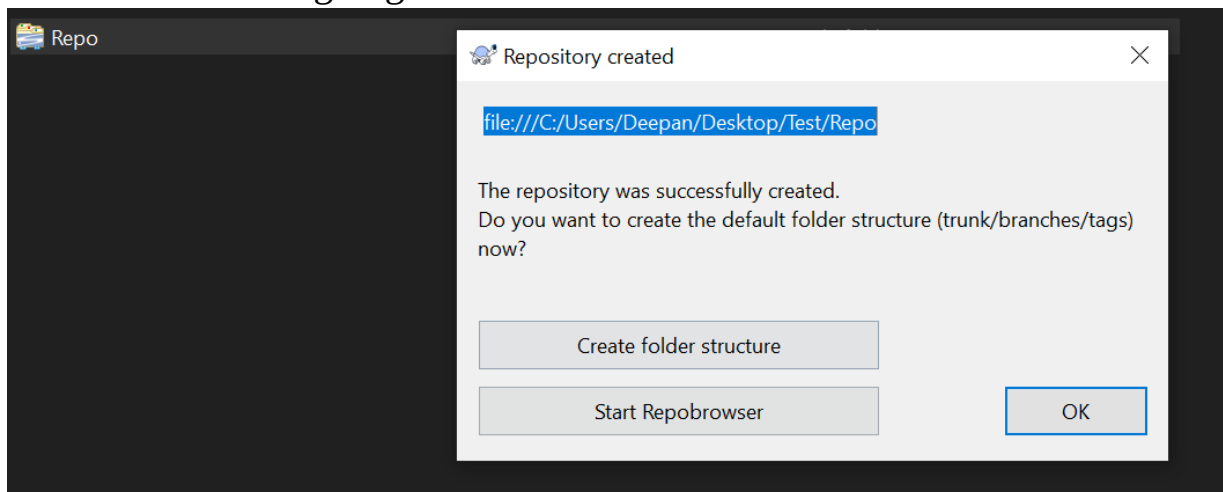
After downloading the file we should install it in the following ways as represented :



After clicking on next we should select the path where it need to be installed and click on the finish button.



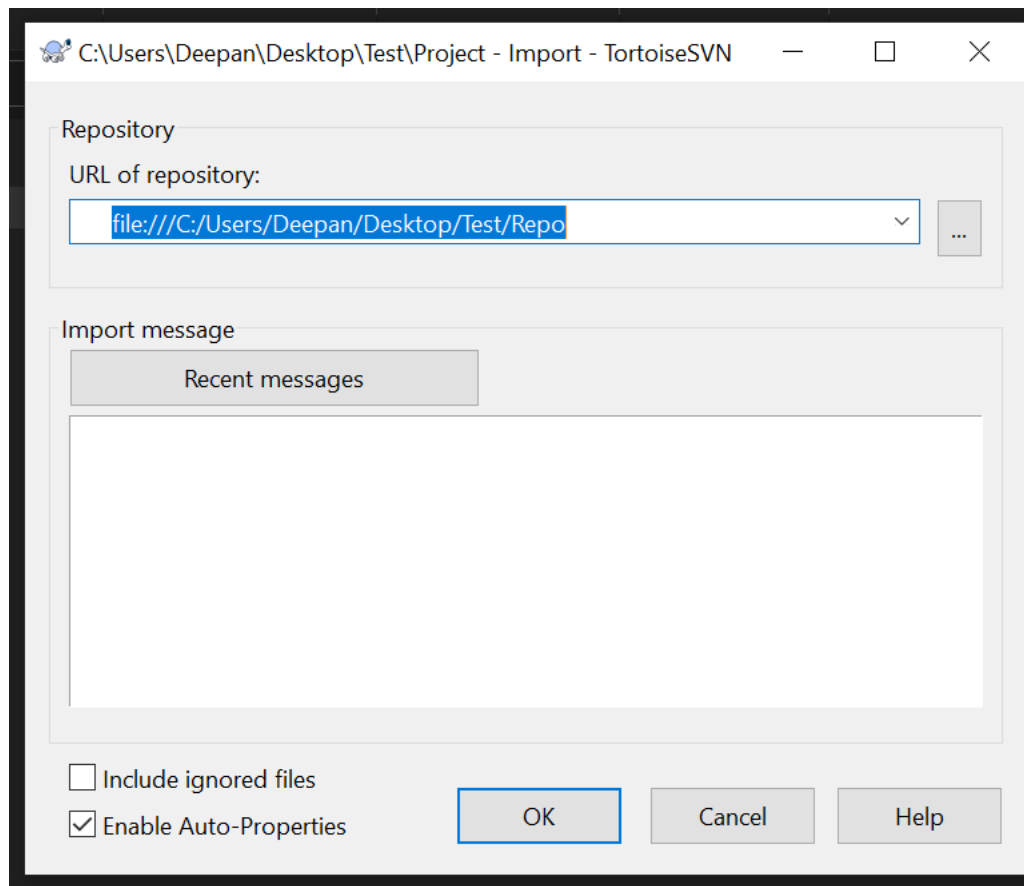
- We can able to see two section of tortoise SVN by clicking right click in mouse pad. It means the software is installed successfully.
- After installing the software. I have created a folder called Test and inside that folder I have created another folder called Repo.
- After that I am going to create a new repository in that Repo folder so tortoise svn is going to add some folders and files inside that.



conf	11/04/2022 10:22 PM	File folder	
db	11/04/2022 10:23 PM	File folder	
hooks	11/04/2022 10:22 PM	File folder	
locks	11/04/2022 10:22 PM	File folder	
format	11/04/2022 10:22 PM	File	1 KB
README	11/04/2022 10:22 PM	Text Document	1 KB
svn	11/04/2022 10:22 PM	Icon	177 KB



So List of folders are created and I am going to create another folder named Projects which contain two test file which is going to be stored in repo folder.

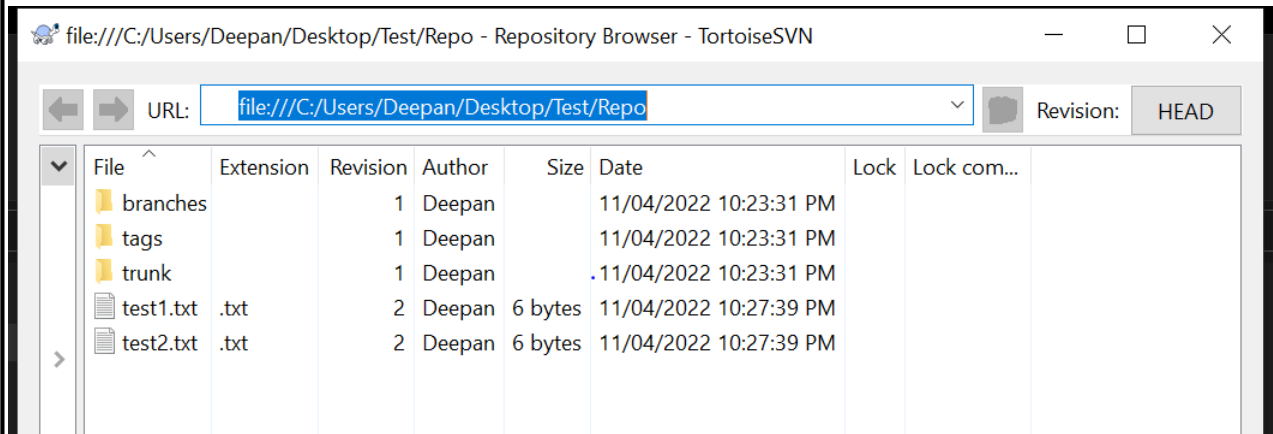


We should paste our Repo folder site or also we can paste web browser site in the text box provided as shown above.

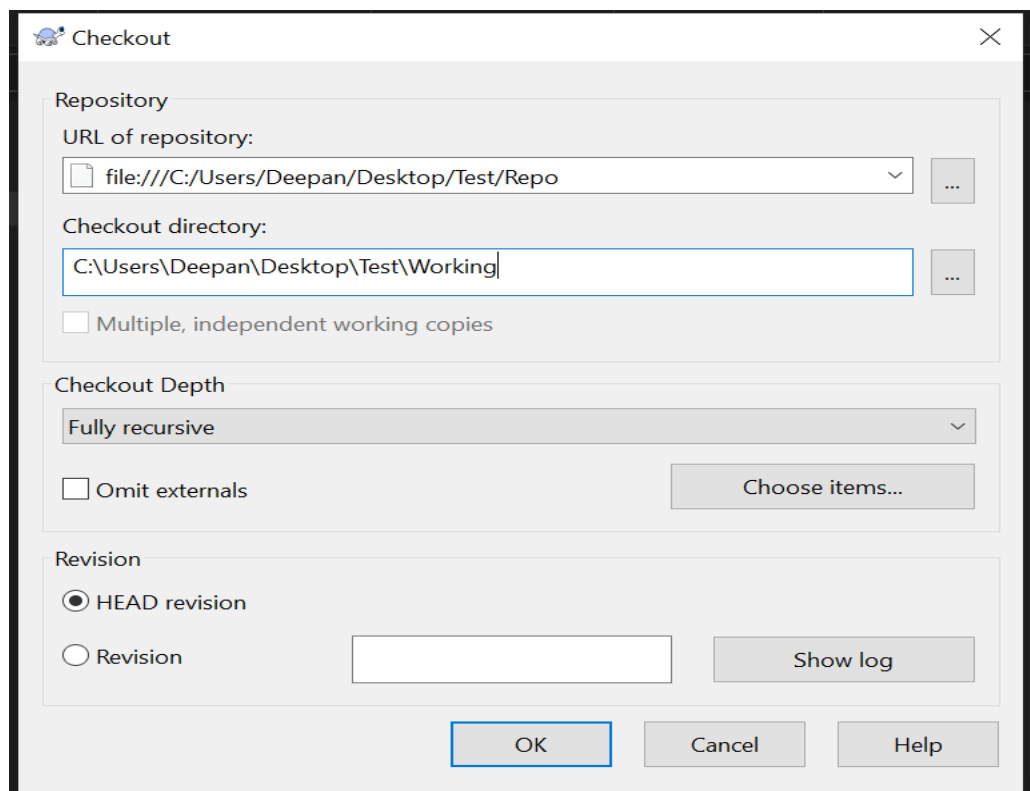
After adding the path we should click ok button to navigate to other screen which shows like two files are added safely in the Repo folder.

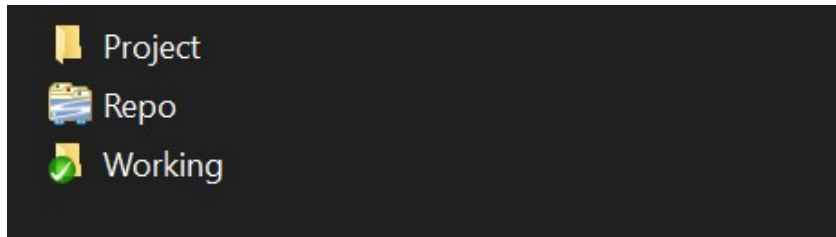


After moving the files to the repo browser. When we need to recheck the folder where it is moved we can click on repo browser and we can see at what time and path we have changed the file as shown below.



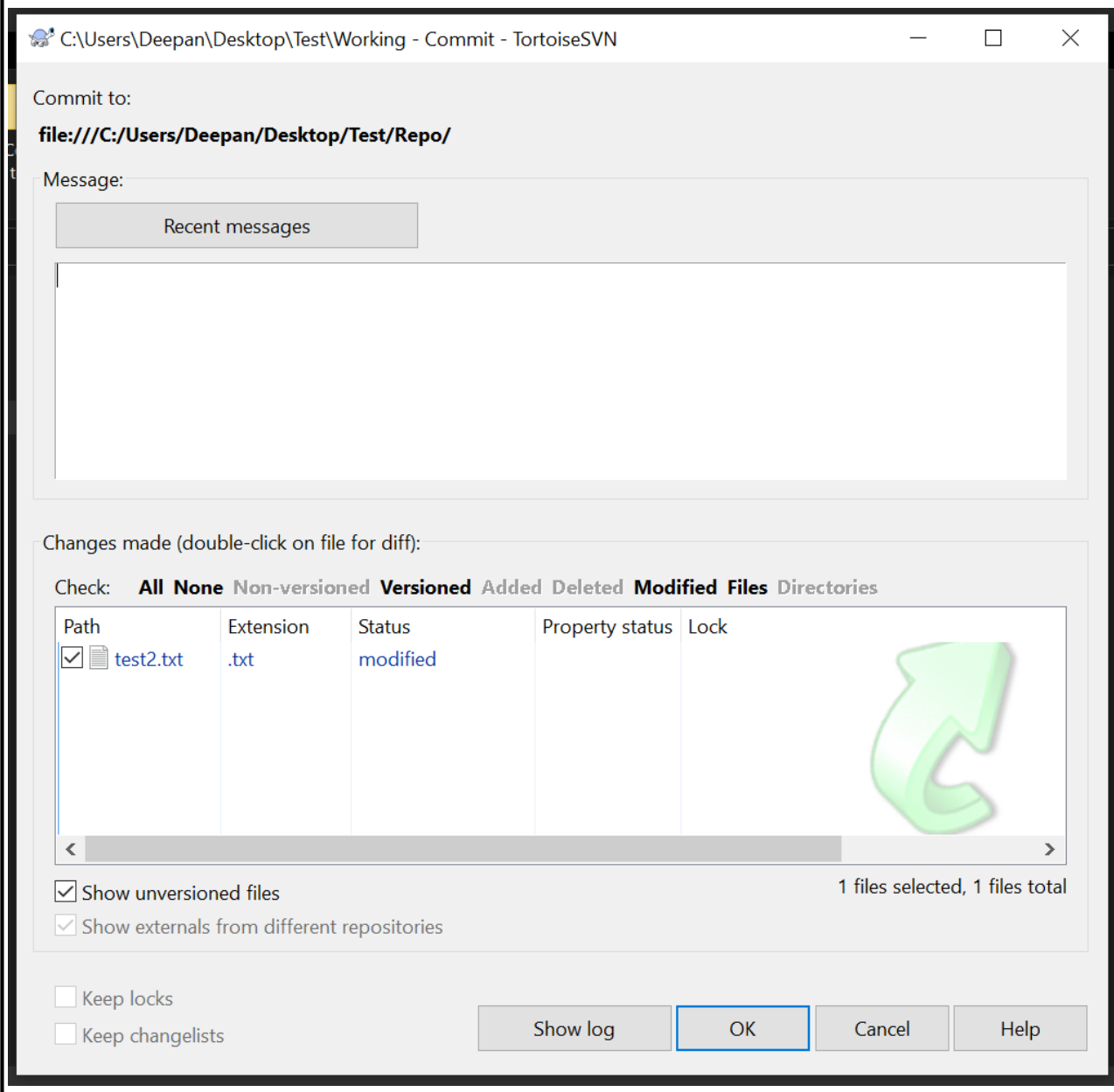
When we need to create a working file we need to provide the repo checkout button on clicking the Repo folder and we can able see a pop up window which shows the file name need to be added and the necessary conditions and then click ok button as shown below.





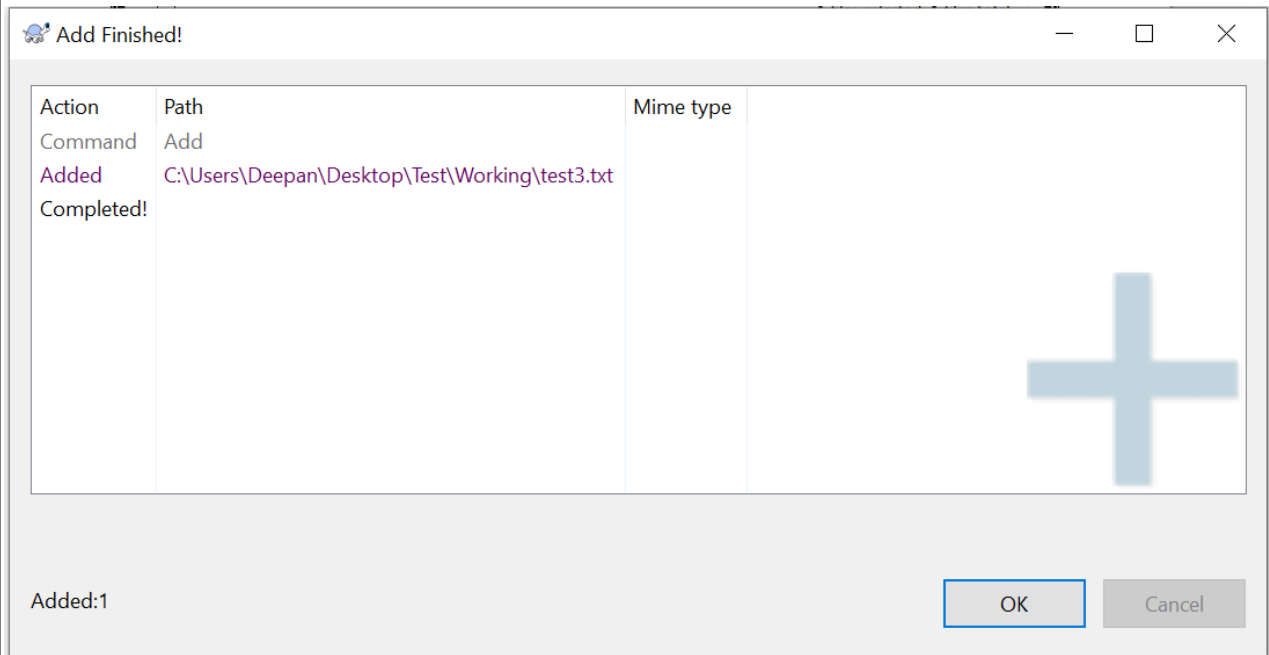
The working folder consists of that two text files.

To make changes in the working file we need to click on the SVN commit which shows a pop up window which shows the recent modifications done in the file at the time. When we override the test file which is in the working folder we can see the changes by using the SVN commit as shown below.

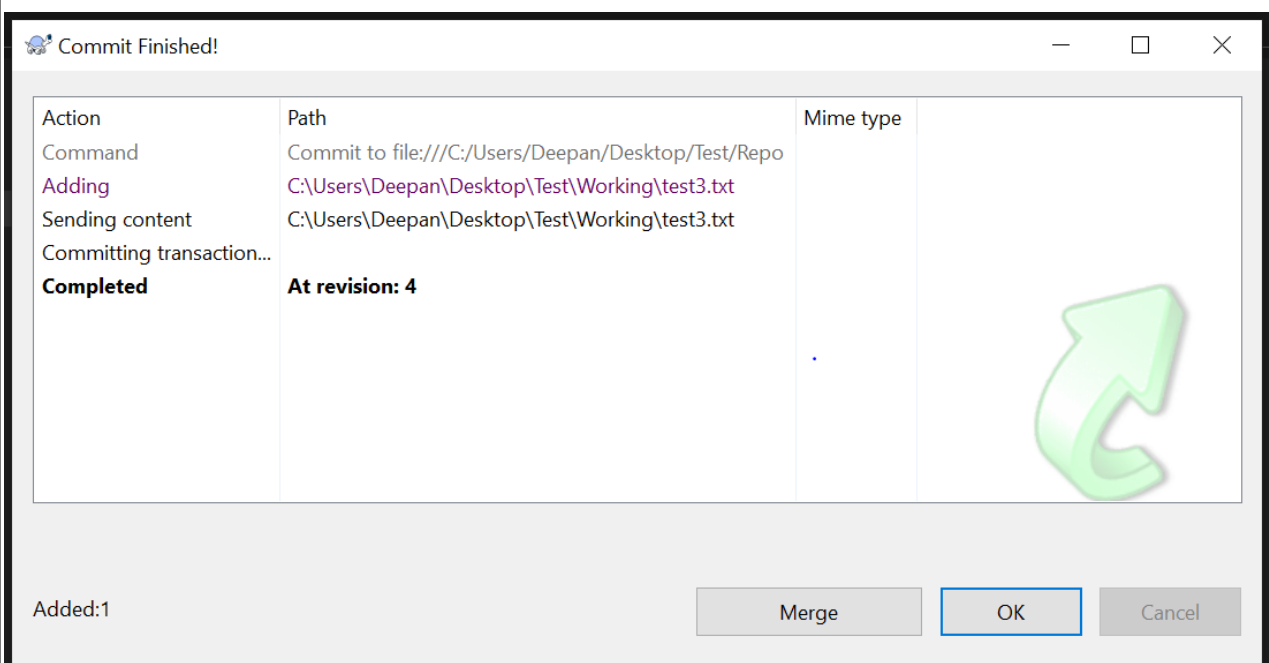


Now lets see how to add more text file in the folder so we need to create a new text file.

In order to store in the server we need to click on the Add on the tortoissvn which add the new file to the server but not in the Repo folder as shown below.



In order to add in the Repo folder we need to click again SVN commit and add the new file in the Repo folder as shown below



It is successfully added in the Repo folder.

In order to record all this activity we need to click on the log option which shows all the activities we have done yet with time and date as shown below.

C:\Users\Deepan\Desktop\Test\Working - Log Messages - TortoiseSVN

Messages, Paths, Authors, Revisions, Bug-IDs, Date, Da From: 11/04/2022 To: 11/04/2022

Revision	Actions	Author	Date	Message
4		Deepan	11 April 2022 10:48:27 PM	
3		Deepan	11 April 2022 10:43:17 PM	
2		Deepan	11 April 2022 10:27:39 PM	
1		Deepan	11 April 2022 10:23:31 PM	Imported folder structure

Path	Action	Copy from path	Revision
/test3.txt	Added		

Showing 4 revision(s), from revision 1 to revision 4 - 1 revision(s) selected, showing 1 changed paths

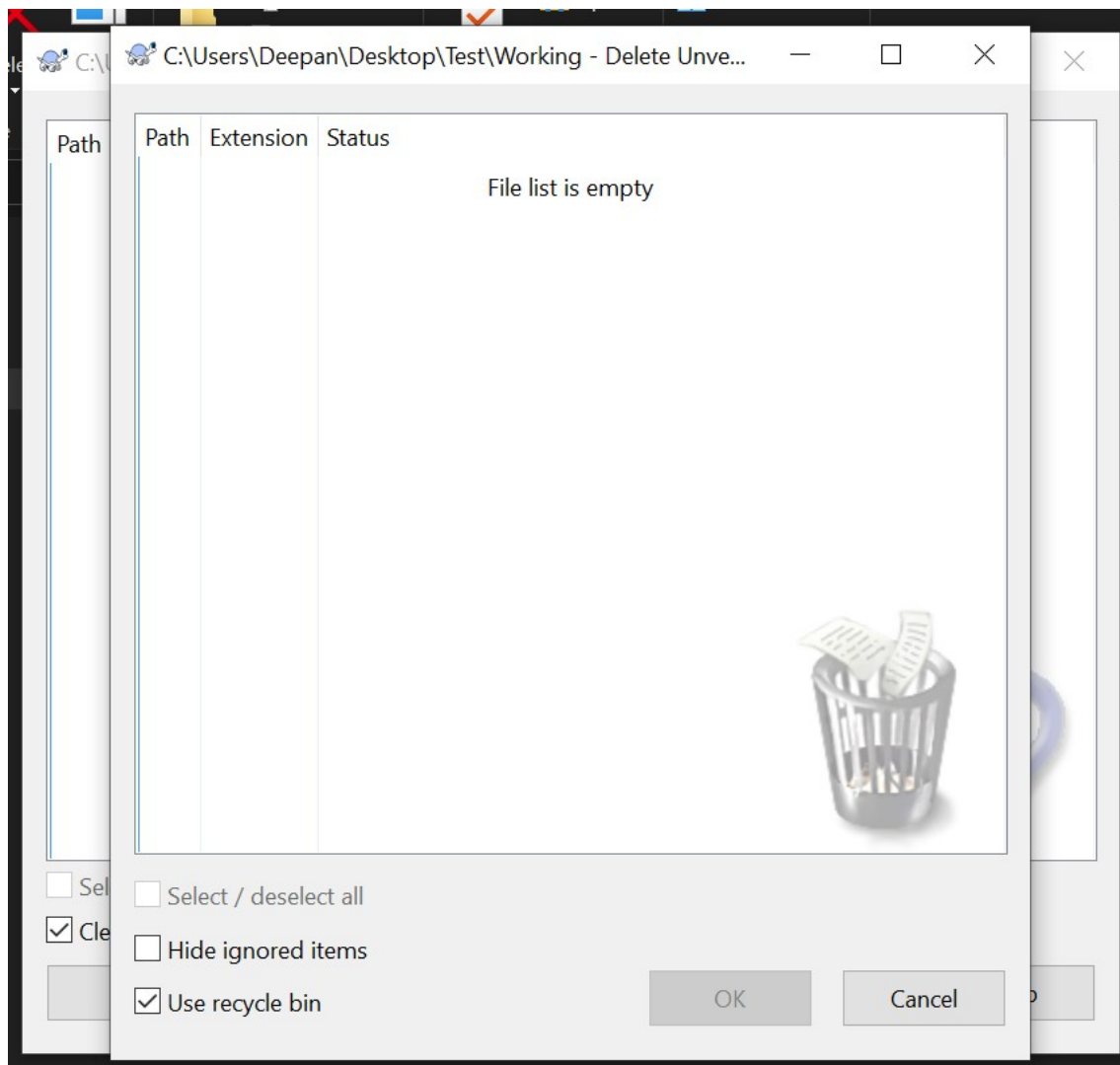
☐ Show only affected paths ☐ Stop on copy/rename ☐ Include merged revisions

Statistics Help

Show All Next 100 Refresh OK

In any case if the software is unstable we need to get older change management or the version control. In order to get those previous version we can click on the revert button and then click on the new file which is added

and move those file to trash by this way we can overcome change management as shown below.



### **Companies using the tool :**

#### **Company :**

- Cision LTD  
Website : [cision.com](http://cision.com)  
Country : United States  
Revenue : 200M – 1000M
- Lorven Technologies  
Website : [lorventech.com](http://lorventech.com)

Country : United States

Revenue : 10M – 50M

- Paper Mart
- doubleSlash
- Foxx CMS
- OneClass

### **Performance of the tool :**

- The overall performance of the software is good.
- The source code is hosted on osdn.net in our own Subversion repository. You can browse the source code with your favourite web browser directly on the repository.
- It is easy to use allows moving files by right-dragging them in the Windows explorer
- Descriptive dialogs, constantly improved due to user feedback
- It also Can create a graph of all revisions/commits. You can then easily see where you created a tag/branch or modified a file/folder

### **Tools Working Domain :**

It works on Windows operating system only.

### **Programming language used :**

It was written in C++ programming language.

### **Drawbacks of the tools :**

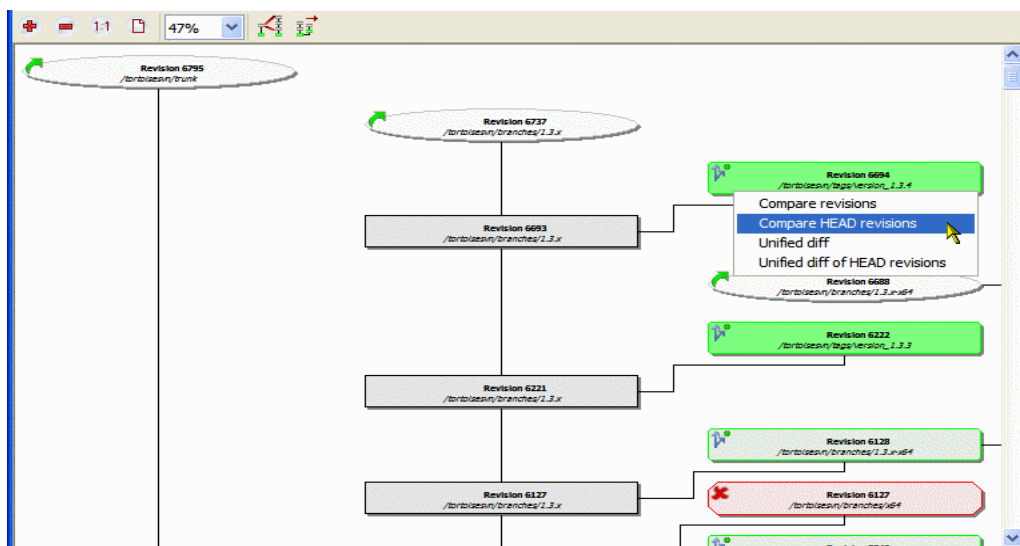
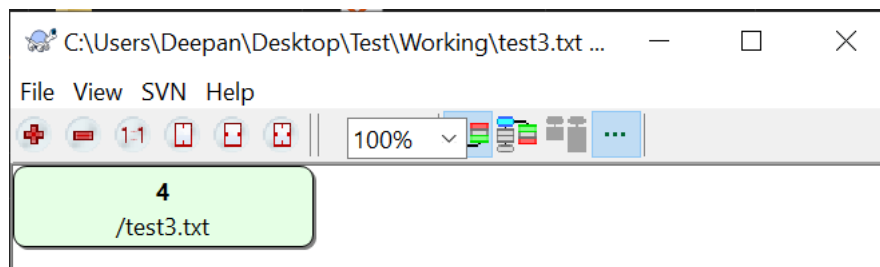
- UI need to be changed.
- It should support all the operating system
- Looking up the history of a file can be very slow, taking several minutes, especially when looking at the history of an entire folder.

## Roles and Responsibilities :

- It is a helpful tool which shows the changes you made to your files.
- Helps resolving conflicts
- It has auto completion path and keywords of the modified file.
- Test formatting with special character.
- It supports all subversion protocol like http, https, svn and etc.
- We can able to see all the status of the file directly in the windows explorer.
- Since it's not an integration for a *specific* DE like Visual Studio, Eclipse or others, you can use it with whatever development tools you like, and with any type of file.

## Graph or chart depicting the performance of the tools with parameter :

It shows revision graph for each and every file by using Revision graph function in tortoise svn.





**Links for the tool's websites :**

<https://tortoisesvn.net/downloads.html>