



K. J. Somaiya College of Engineering,

Mumbai-77

(Autonomous College Affiliated to University of Mumbai)

Batch: A2

Roll No.: 16010121045

Experiment / assignment / tutorial No 8

TITLE: Study of Configuration Management Tool

AIM: To learn Configuration management

Expected OUTCOME of Experiment:

Books/ Journals/ Websites referred:

1. Roger Pressman, Software Engineering: A practitioners Approach, McGraw Hill, 2010, 6th edition.
2. Ian Somerville, Software Engineering, Addison Wesley, 2011, 9th edition.
- 3 http://en.wikipedia.org/wiki/Software_requirements_specification

Introduction:

In Software Engineering, **Software Configuration Management (SCM)** is a process to systematically manage, organize, and control the changes in the documents, codes, and other entities during the Software Development Life Cycle. The primary goal is to increase productivity with minimal mistakes. SCM is part of cross-disciplinary field of configuration management and it can accurately determine who made which revision.

Study and prepare a document on any one Software Management Configuration Tool:

Tool Chosen: Ansible

→ **Definition:**

- Ansible tool offers simple IT automation solution. It helps you avoid performing repetitive tasks and frees up developer teams for more strategic work.



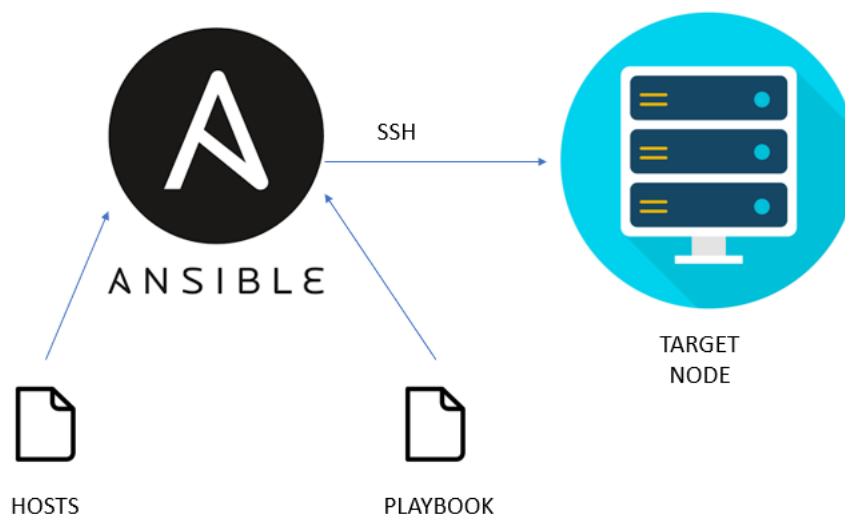
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- Ansible is a modern configuration management tool that facilitates the task of setting up and maintaining remote servers, with a minimalist design intended to get users up and running quickly.
- Users write Ansible provisioning scripts in YAML, a user-friendly data serialization standard that is not tied to any particular programming language. This enables users to create sophisticated provisioning scripts more intuitively compared to similar tools in the same category.
- As a configuration management tool and automation framework, Ansible encapsulates all of the common features present in other tools of the same category, while still maintaining a strong focus on simplicity and performance:
- Automation is essential to establishing reliable, consistent IT operations—with less downtime and improved return on investment. With automation, your team can deploy and decommission infrastructure components in just minutes (instead of hours or days), establish and maintain desired configuration states across multiple systems, and ensure compliance.
- Ansible Automation Platform is a robust platform that assumes the work of disparate solutions to help you establish a target baseline for systems, tackle system installations and updates, validate change requests, and more using easy-to-understand Ansible playbooks.
- You can bring your IT operations teams and developers together using a shared language and common framework.

→ **Features:**





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- **Agentless and secure:** Ansible Automation Platform is agentless—executing tasks and delivering all modules via Open Secure Shell Protocol (OpenSSH) to securely declare the desired configuration of your systems. OpenSSH is recognized for its secure, lightweight performance (essential for edge devices) and support across cloud platforms including AWS, Google Cloud, and Microsoft Azure.
- **Declarative:** Ansible Automation Platform uses a declarative model that lets you describe the "what" (desired state of your systems and services) versus the "how" (steps to achieve that desired state). This goal-centric approach makes it easier for your IT operations teams to quickly start automating and supports reliable, idempotent infrastructure configuration.
- **Feature-rich:** Ansible Automation Platform includes access to over 125 certified content collections from more than 60 industry partners through the Red Hat hybrid cloud console. Using pre-built playbooks and modules, Ansible Content Collections help you jump-start automation for configuration management around specific platforms and use cases and share content across teams for greater collaboration and efficiency.
- **Automate Now:** From the moment you can ping the hosts through Ansible, you can start automating your environment. Begin with small tasks, following best practices, prioritizing tasks that add value to the business, solve major problems, and gain time and improving productivity.
- **Low Learning Curve:** Ansible is easy to deploy because it uses no agents or additional custom security infrastructure. It also leverages YAML, a simple language to describe your automation job via playbooks. Playbooks push the desired settings on the hosts defined in the inventory and can even be run ad hoc (via the command line, not requiring definitions in files).

→ **Working:**

- Ansible is written in python. It works by connecting remote hosts via ssh mentioned in the inventory file. It uses a push mechanism to connect to the host and push out the small programs known as ansible modules that run the plays & tasks defined in the client's playbook over ssh. The node on Which Ansible is installed is the controlling node, also known as the Ansible management node, which controls the entire playbooks' execution. After installation, it removes modules used.
- There are many use cases but this is one of the most common ways most people use Ansible. So here we have the non Ansible way so we have a user and an admin and admin is maintaining four servers the three servers are web servers and one of the server is a database.



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- So, admin wants to install Tomcat then the admin will have to install Tomcat on server one. Then install Tomcat on server two and install Tomcat on server three and then install MySQL on the database server, so basically the admin has to repeat all the steps again and the chances are here that he or she can make a mistake and the server's may not look same so, there comes ansible tool which makes life easier.
- Admin instead of issuing commands to the server's individually, will issue a command to one machine and that machine will communicate with the other machines so admin can just issue one command say install Tomcat on all the web servers and then this machine will actually go ahead and install Tomcat on the other machines in our infrastructure and then the admin can say issue a command call say install MySQL and then the machine will go ahead and install MySQL on the database server so here the task of admin is reduced the admin doesn't have to maintain multiple machines.
- Once you install Ansible, it will not add database automatically and there will be no daemons to be started or running. A Daemon is a computer program that runs as a background process rather than under the direct control of an interactive user. Ansible is written in python language, so its need to be installed on the remote host.

→ **Application in mini project:**

Ansible is designed to be very simple, reliable, and consistent for configuration management. Our app consists of multi-user software and added hardware component can be implemented. Ansible is helpful in this case as it lets you quickly and easily deploy multitier apps. We won't need to write custom code to automate our systems. The biggest advantage of Ansible is security and compliance. This helps us deploy the face detection app without any concerns. If we configure the security details on the control machine and run the associated playbook, all the remote hosts will automatically be updated with those details. That means we won't need to monitor each machine for security compliance continually manually. Due to these reasons Ansible is the perfect software configuration management tool for our project.

Conclusion: Through this experiment we understand the importance and use of software configuration management tools. In this case, we studied the Ansible tool and identified its use in our mini project, CodeCat - Online Compiler .



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Post Lab Subjective Questions

1) State uses of SCM.

Supply Chain Management (SCM) is a critical component of modern business operations. It involves the management of the entire process of delivering products or services from suppliers to customers. The primary uses of SCM include:

1. **Inventory Management:** SCM helps in optimizing inventory levels to ensure that a company has the right amount of products or materials at the right time. This reduces carrying costs while preventing stockouts or overstock situations.
2. **Demand Forecasting:** Accurate demand forecasting is essential for businesses. SCM utilizes historical data and market trends to predict future demand, enabling companies to adjust their production and procurement accordingly.
3. **Supplier Relationship Management:** SCM focuses on building strong relationships with suppliers. This includes negotiations, contracts, and performance monitoring to ensure a stable and efficient supply of materials or products.
4. **Production Planning:** SCM helps in planning production schedules to meet demand while minimizing production costs. It involves capacity planning, labor allocation, and resource management.
5. **Distribution and Logistics:** Efficient transportation and distribution networks are crucial for timely delivery. SCM optimizes the routing, scheduling, and tracking of products to minimize transportation costs and reduce lead times.
6. **Quality Control:** Maintaining product quality is essential. SCM ensures that quality standards are met at every stage of the supply chain, reducing defects and returns.
7. **Cost Reduction:** SCM strategies help in identifying cost-saving opportunities throughout the supply chain, including procurement, production, and distribution.
8. **Risk Management:** SCM can identify and mitigate potential risks in the supply chain, such as disruptions due to natural disasters, political instability, or economic fluctuations.
9. **Information Management:** Effective SCM relies on the integration and analysis of data from various stages of the supply chain. This data-driven approach helps in making informed decisions.
10. **Sustainability and Ethical Considerations:** SCM can incorporate sustainability and ethical practices by ensuring that suppliers adhere to environmental and social responsibility standards.
11. **Customer Service Improvement:** By optimizing the supply chain, companies can provide better customer service through on-time deliveries, accurate order fulfillment, and responsive communication.



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12. **Compliance and Regulatory Adherence:** SCM helps businesses comply with various industry and government regulations, such as import/export laws and safety standards.
13. **Global Expansion:** Companies can use SCM to manage complex global supply chains, including sourcing from multiple countries and complying with international regulations.
14. **Strategic Planning:** SCM plays a crucial role in overall business strategy. It helps companies align their supply chain strategies with their long-term business objectives.
15. **Continuous Improvement:** SCM involves a continuous improvement cycle, where processes are regularly assessed, and adjustments are made to enhance efficiency and effectiveness.

In summary, Supply Chain Management is a multifaceted discipline that plays a central role in the success of businesses by optimizing processes, reducing costs, and ensuring products or services reach the customers in a timely and cost-effective manner.