TOPIC : MAVEN INTRODUCTION

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What is Maven :-

Maven is a build automation and project management tool used primarily for Java projects. It simplifies the build process, manages dependencies, and automates various development tasks through its project object model (pom.xml). It follows a convention-over-configuration approach, reducing manual effort.

Why Maven :-

Simplifies dependency management using a central repository.

Automates the build lifecycle, reducing manual configurations.

Provides a standardized project structure.

Supports multiple plugins for testing, packaging, and deployment.

Integrates easily with CI/CD tools like Jenkins.

Real-Time Applications of Maven:

Managing dependencies in large-scale Java applications.

Automating build and deployment processes in software development.

Integrating with CI/CD pipelines to streamline DevOps practices.

Creating and managing multi-module projects efficiently.

Ensuring consistency across different environments in enterprise applications.

Seven Steps in Maven

Phase	**Description**
Validate	Ensures the project structure is correct and

	dependencies are available.
Compile	Compiles the source code (src/main/java).
Test	Runs unit tests using JUnit/TestNG (src/test/java).
Package	Creates a JAR/WAR file inside the target/ directory.
Verify	Runs integration tests (if defined).
Install	Installs the package into the local repository (~/.m2/repository).
Deploy	Deploys the package to a remote repository.

Maven vs Ant :

Feature	Maven	Ant
Configuration	Follows a declarative approach using pom.xml	Follows an imperative approach using build.xml
Dependency Management	Built-in dependency management	Requires manual handling of dependencies
Ease of Use	Easier to manage with predefined lifecycles	Requires explicit task definitions
Scripting Support	Minimal scripting, follows convention over configuration	Supports scripting for custom build processes
Project Structure	Enforces a standard directory structure	No predefined project structure

Plugin Support	Extensive plugin support for automation	Limited plugin support
Performance	Efficient due to lifecycle management	May require manual optimizations

Similar Tools Like Maven

Gradle – Flexible and powerful, supports both declarative and imperative builds.

Ant – A procedural build tool that requires manual dependency management.

SBT – Used mainly for Scala-based projects, integrates with Maven repositories.

Bazel – Scalable build tool from Google, supports multiple languages.

Make – Commonly used in C/C++ projects for build automation.