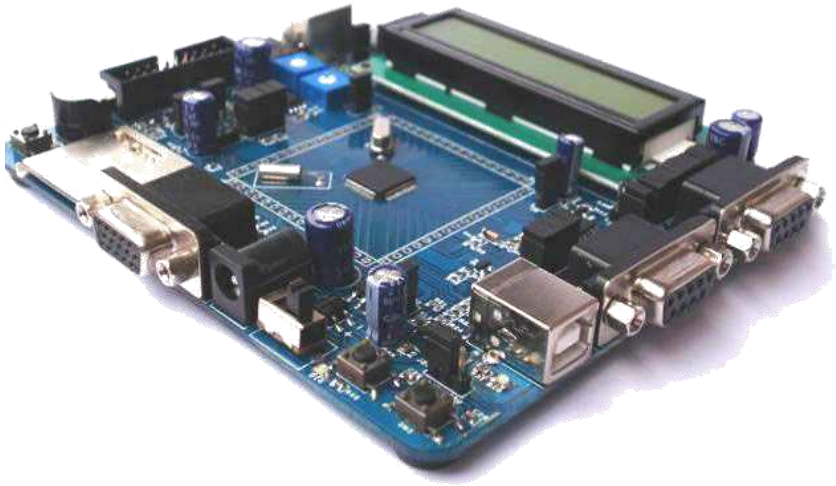
AMIT
Beyond Education

Tooling:
Software Configuration Management



Agenda

1. What is Configuration Management?
2. Why Configuration Management?
3. SCM Process
4. SCM Roles
5. Tools
6. Getting Started with Git
7. Lab

What is Software Configuration Management(SCM)?

- SCM is the task of tracking and controlling Software Configuration items.

- CI : Configuration item is
- SCM concerns answering the question of "Somebody did something , how can someone else reproduce it?"

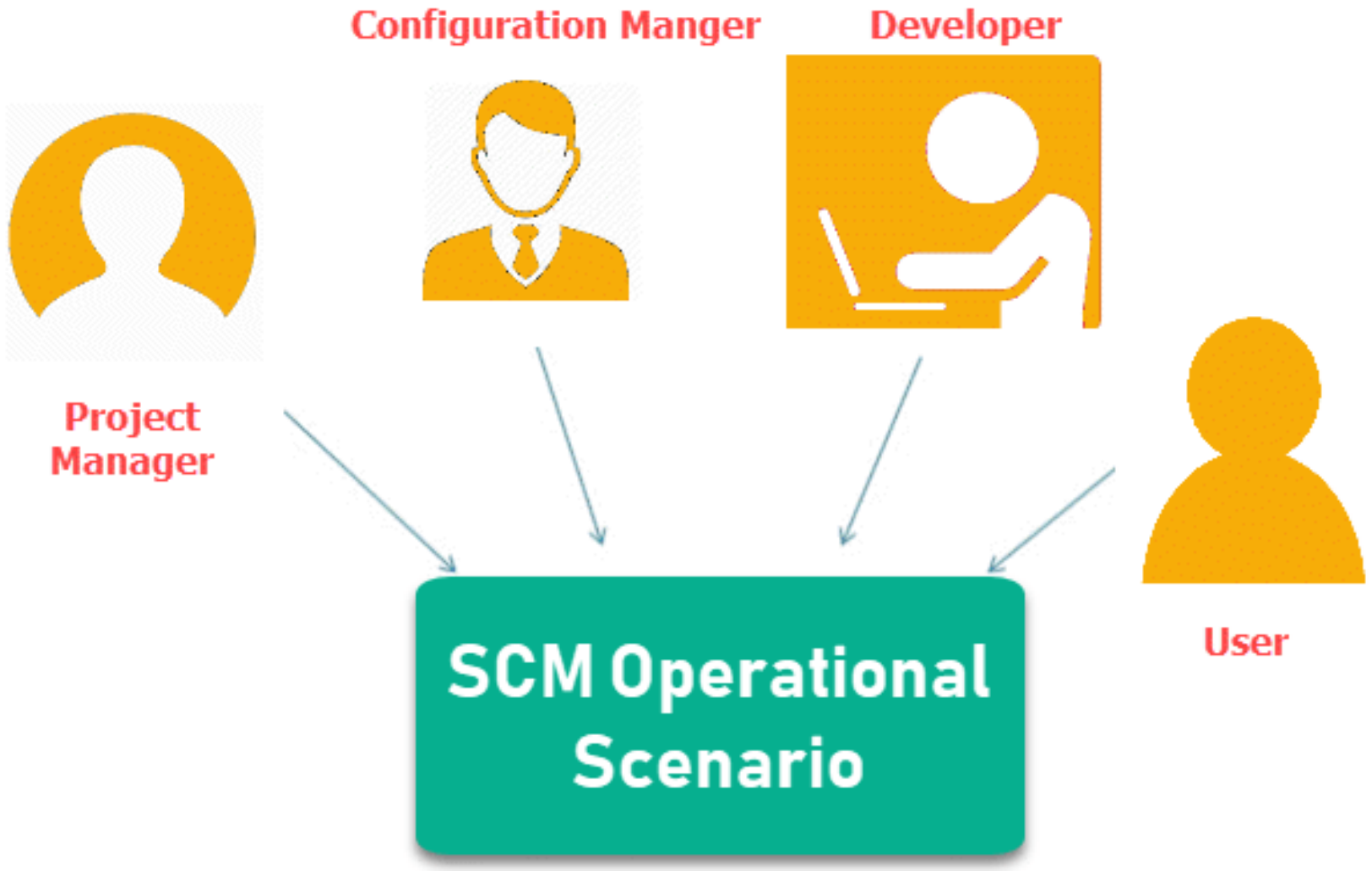
Introduction to SCM parameters

- Multiple Users/Developbers
- Repository :It is a central database multiple files
  - It is server based
  - Local on your machine
  - Web based on a remote server
- User/access rights
- Artifacts

Purposes of SCM

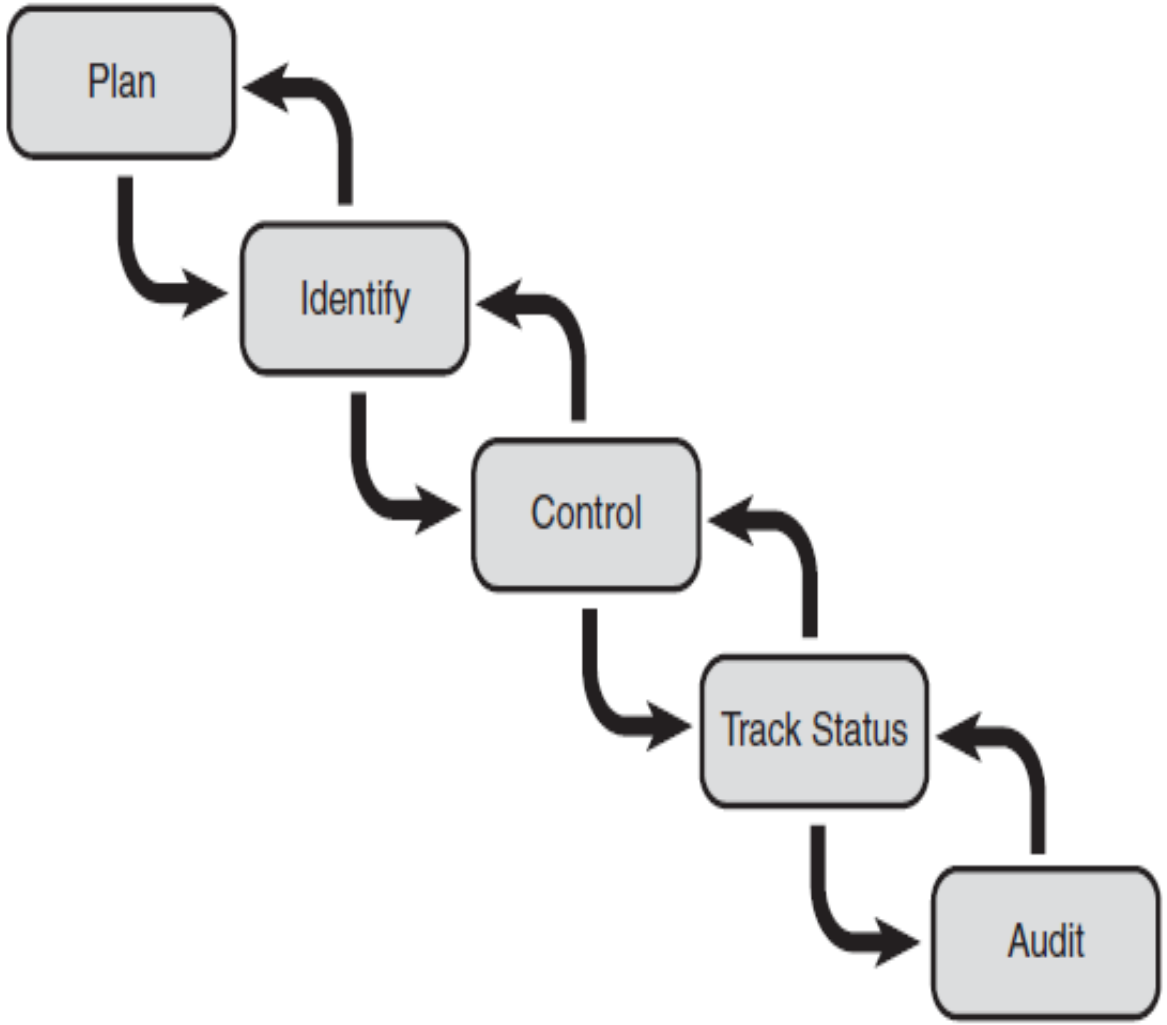
- Build management
- Managing the process and tools used for builds.
  - Process management
- Ensuring adherence to the organization's development process.
  - Environment management
- Managing the software and hardware that host the system.
  - Teamwork
- Facilitate team interactions related to the process.
  - Defect tracking
- Making sure every defect has traceability back to the source.

Software Configuration Management (SCM)



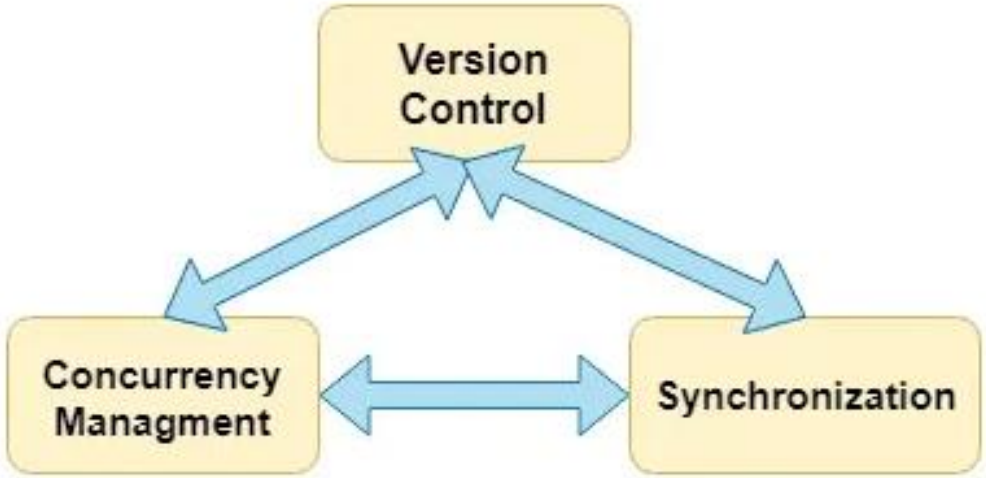
SCM Process

1. To identify all items that collectively define the software configuration
2. To manage changes to one or more of these items
3. To facilitate the construction of different versions of an application
4. To ensure that software quality is maintained as the configuration evolves



SCM Features

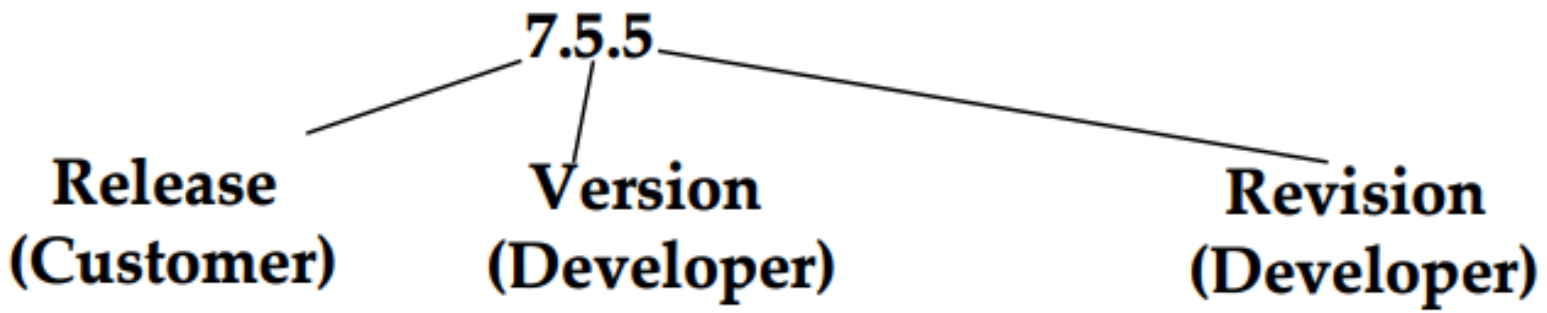
- **Version Control:** Version control allows users to manage and organize the versions of their work. Apart from this, it maintains the older versions of the work so that the user can roll back to the previous stage at any point of time.
- **Concurrency management:** This feature enables multiple users to work on the same file without losing anyone's work. Usually, the development team consists of several developers and there can be a situation that more than one developer is working on the same file. So this attribute allows merging the changes from both the developers.
- **Synchronization:** This feature allows team members to be in sync with each other's work, if you are modifying a file that is shared with others and they modify it too, this feature updates your local ones before you can upload the new.



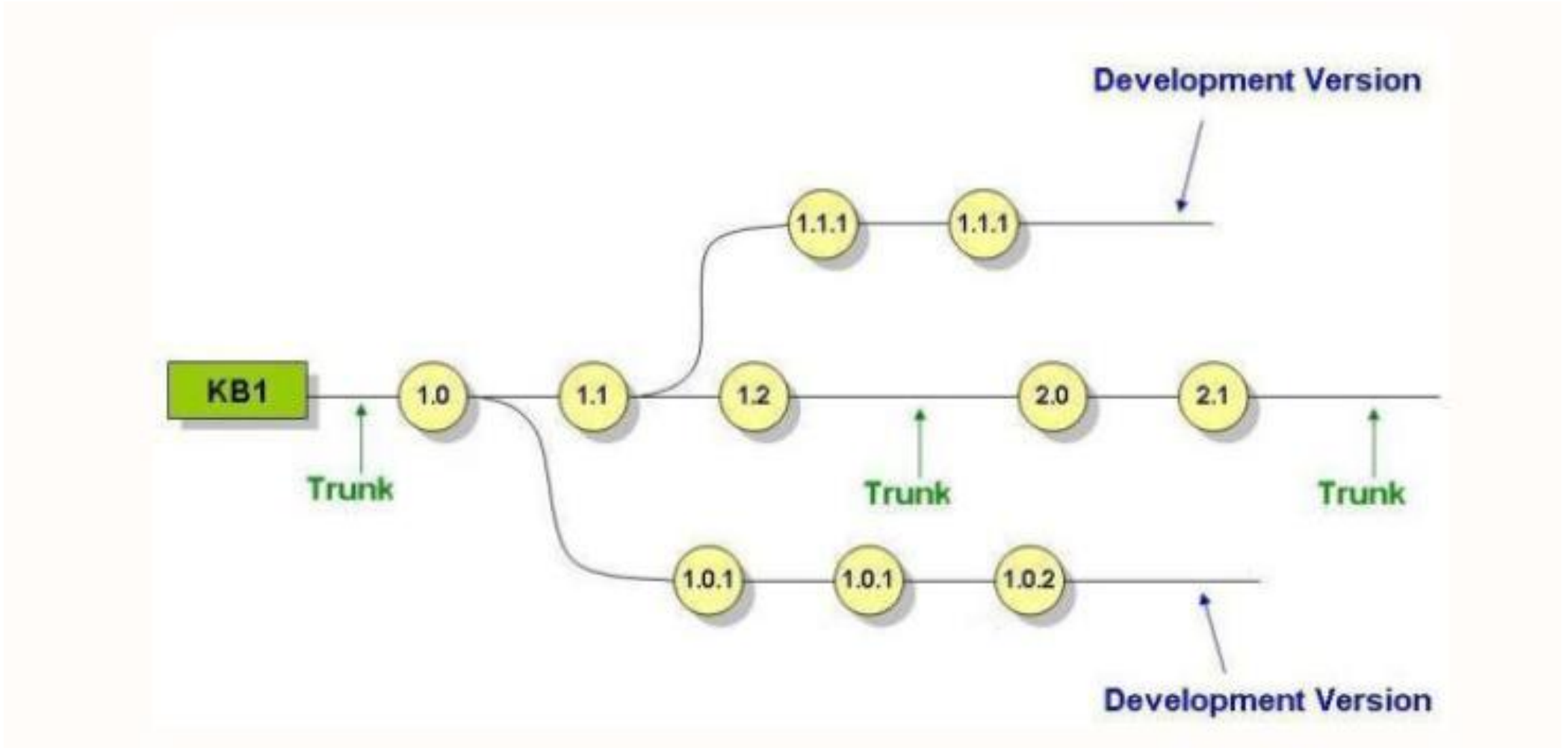
Configuration management features

Version Control

1. Release: is also called major and which is delivered to the customer and increased when making new API(Application Programmable Interface) as a new release
2. Version: as minor is increased when delivering new features with the same API
3. Revision: also called patch and increased when bug fixing



Baseline


Development Version
1.1.1
1.1.1
KB1
1.0
1.1
1.2
2.0
2.1
Trunk
Trunk
Trunk
1.0.1
1.0.1
1.0.2
Development Version

SCM Scenario “1”

1. I want to see the code
   - Check out if the artifact is exist or not (it returns a copy in local PC)
2. Modify the cide and upload it
   - Check-in (commit)
3. Another one needs to get the updated Repo to his local copy
   - Update sees which files were modified and update them
4. What if the 1st has wrong changes
   - In case of text: it save the changes only
   - In case of binary files: it saves the complete files
   - This makes each have different versions
   - Revert back to older version
5. To have the latest version
   - Top of the trunk

SCM Scenario “2”

If 2 Developers want to change in the same file at same time

1. **Developer#1**: Make change and upload it
2. **Developer#2**: Make change and wants to upload it

•The repository refuse to save the changes (the file on the server is more recent than you have).

•Make update (this make merge between the 2 files if and only if the 2 changes are separated in lines) if not the tool return conflict no update (change it manual).
•upload the Changes

SCM Servers

Software configuration management is normally ,supported by tools with different functionality.

Examples:

RCS – very old but still in use; only version control system

CVS – based on RCS, allows concurrent working without locking

Perforce – Repository server; keeps track of developer's activities

ClearCase – Multiple servers, process modeling, policy check mechanisms

Lab 1

1. Register Account on github.com
2. Create your own Repository on github
3. Use Git clone to download a copy of the Repo.
4. Update the files in the directory of the Repo.
5. For the first time using git you need to configure your user.email and user.name using:
   - git config –global user.email “email@domain.com”
   - git config –global user.name “name”
6. Use git add . (to add files to a buffer that will be uploaded to the remote server)
7. Use git commit –m “message” (specify your own commit message)
8. Using git push –u origin master to upload your files

Lab 2

1. Use git init to start a Repo on your local machine
2. Use git add . (to add files to a buffer that will be uploaded to the remote server)
3. Use git commit –m “message” (specify your own commit message)
4. Using git push –u origin master to upload your files

Lab 3

1. Create branch other than the master branch to be called dev
   - Git branch dev
   - Git branch – list to know how many branches
2. Use git status
3. Change Head pointer to the dev branch instead of pointing to master branch
   - To switch to the other branch use git checkout dev
4. Use git commit –m “message” (specify your own commit message)
5. Using git push –upstream origin dev to upload your files

References

- Software Configuration Management Video : https://www.youtube.com/watch?v=AaHaLjuzUm8
- Download Git : https://git-scm.com/downloads
- Git tutorial : https://www.youtube.com/watch?v=pDmYNK68IEc