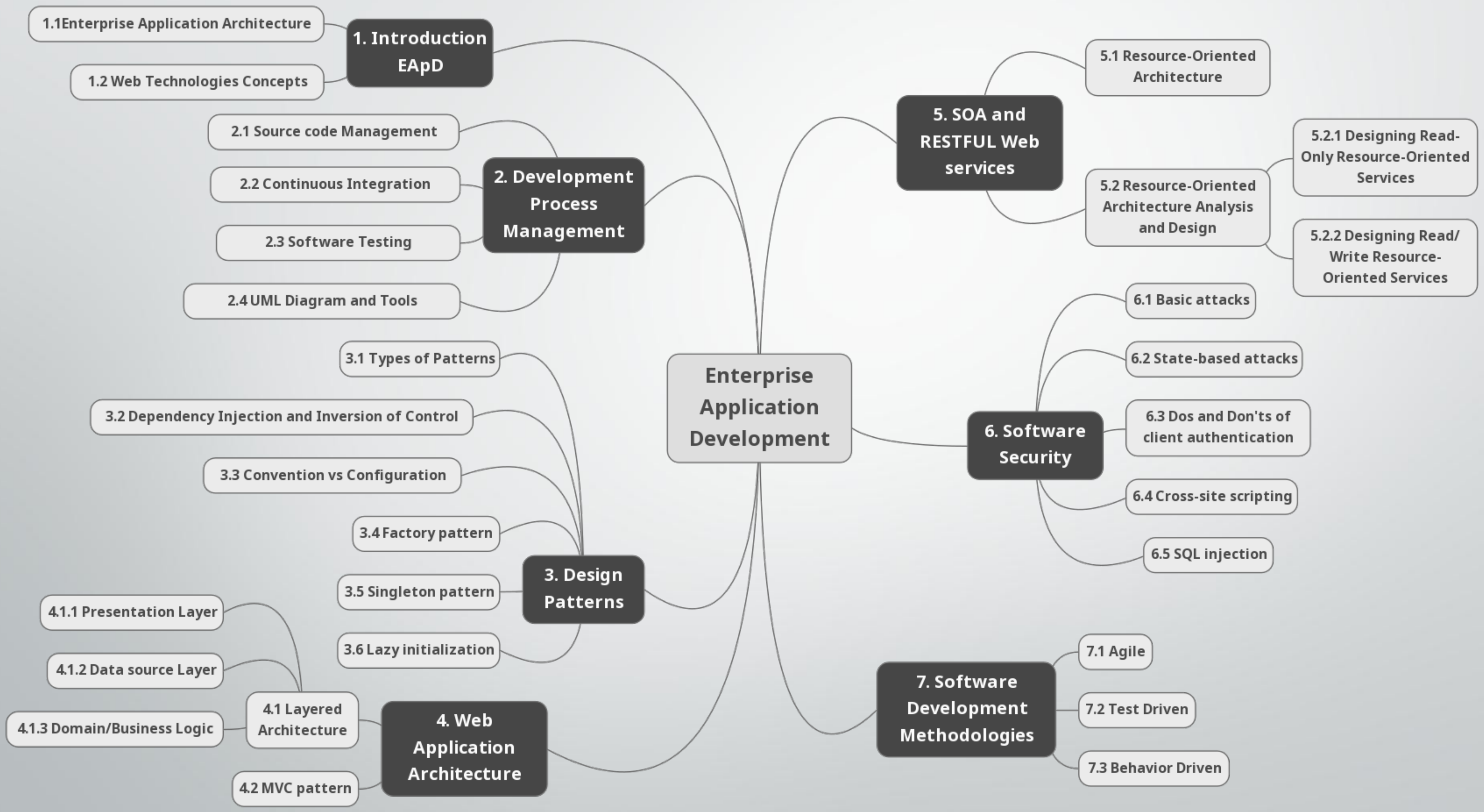
Enterprise Application Development

[BE SE-7th Semester]

Nepal College of Information Technology

POKHARA UNIVERSITY

Enterprise Application Development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Source Code Management

- Also known as Configuration Management
- Source Code Managers are tools that:
  – Archive your development files
  – Serve as a single point of entry/exit when adding or updating development files

Why You Want
A Source Control System ?

- Supports concurrent development
- Manage diverging source code bases
- Records file/release versions
- Easy access to all previous revisions
- Can record *why* a revision was made
- Optimal disk space usage
- You’ll end up doing something equivalent anyway so it may as well be automated

Source Code Management Tools Are Not

A substitute for project management

A replacement for developer communication

How They Work

- Central database of source code, documentation, build tools
- Each file stored only once - all other versions are diffs of that one copy
- To Make a Change
  - Check out the latest version of a file
  - Make the changes
  - Update the database

What should be in the database

- Source Code
- Documentation
- Build Tools
  - Often need old versions of the tools to build old versions of the software
  - Ensures software is rebuilt exactly as the customer received it
- Test Suites
- Anything else you might want later

Version Control

- Companies ship several products from the same source base (ie Win NT and Windows 2000 versions of MS Office)
- When tracking down bugs you want to examine the code as it was when the product shipped

Code Sharing

- Multiple people can work on the same source base without colliding
  - (1) Locks individual files so only one person at a time can modify it *OR*
  - (2) Allows multiple people to modify a source file and the system will automatically merge the changes (usually)

Locking

- Only one person can work on a file at once
- Works fairly well if developers work on different areas of the project and don’t conflict often
- Problem 1: People forget to unlock files when they are done
- Problem 2: People work around locking by editing a private copy and checking in when the file is finally unlocked - easy to goof and lose changes

Merging

- Several people can work on a file at once
- Before committing changes, each user merges their copy with the latest copy in the database

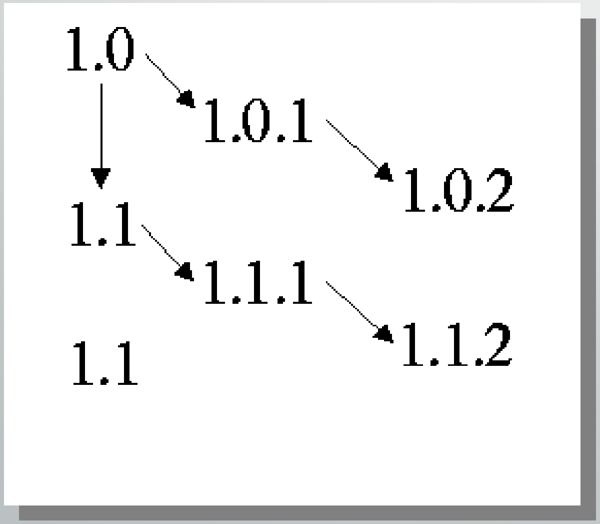
– This is normally done automatically by the system and usually works, but you should not blindly accept the result of the merge

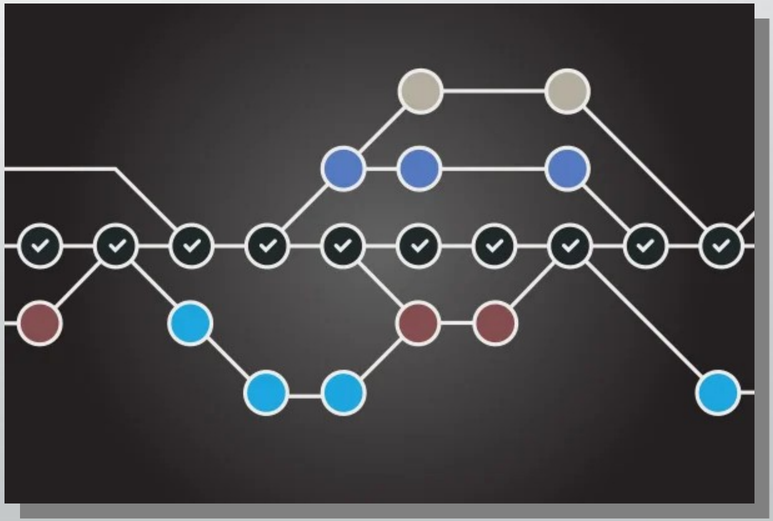
Labelling

- Label all the files in the source base that make up a product at each milestone
- Just before and just after a major change
(eg. changing several interfaces)
- When a new version ships

Version Trees

- Each file in the database has a version tree
- Can branch off the version tree to allow separate development paths
- Typically a main path (trunk) for the next major version and branches off of shipped versions for maintenance





Branching

- When a new version ships, typically create a branch in the version tree for maintenance
- Double update: fix a defect in the latest version and then merge the changes (often by hand) into the maintenance version
- Also create personal versions so you can make a change against a stable source base and then merge in the latest version later

Examples

- **Revision Control System (RCS)**

  → Solaris: man rcsintro

- **Concurrent Versions System (CVS)**

  →Solaris: man cvs

  → www.cyclic.com/cvs/info.html

- **Visual SourceSafe**

  → msdn.microsoft.com/SSAFE

- **ClearCase** → www.rational.com

- **Git** →www.git-scm.com

Revision Control System (RCS)

- File management only
- Transaction model
  - check out and lock
  - edit
  - check in and unlock
- Little support for binaries

Concurrent Versions System (CVS)

- Built on top of RCS
  - Therefore little support for binaries
- Database can be remote
- No locking: merge before commit
- Fast
- Integrates with emacs

SourceSafe

- Microsoft’s entry into the field
- Project-based
- Checkout-edit-checkin model
- Built-in web site creation tools
- Integrates with MSDEV

Clearcase

- Clearcase is configuration management on steroids
- You create a *view* of the database with a *config spec*, which describes how to select files from the database.
- When you set a view, Clearcase creates a virtual filesystem containing only those versions of the files selected by the config spec

Clearcase Features

- Distributed System
  - Several groups at different locations can work on the same database
- Can install triggers
  - Example: e-mail the author of a file when some one makes a change to it
- Uses merging model like CVS, but can also lock files

More Clearcase Features

- Integrates with MSDEV
- Build Management
  – Knows to rebuild out-of-date files even if your makefile doesn’t
- Slow and a bit buggy

Helpful Rules for Version Control Bliss

- Archived Files Should Always Compile
- Code Review Files Before Check-in
- Compile and run latest archived files *as a set* before Check-in
- No Cheating (even “simple bug fixes” need to undergo this process)

Version Control →Best Practices

- Commit logical changesets (atomic commits)
- Commit Early, Commit Often
- Write Reasonable Commit Messages
- Don’t Commit Generated Sources
- Don’t Commit Half-Done Work
- Test Before You Commit
- Use Branches
- Agree on a Workflow

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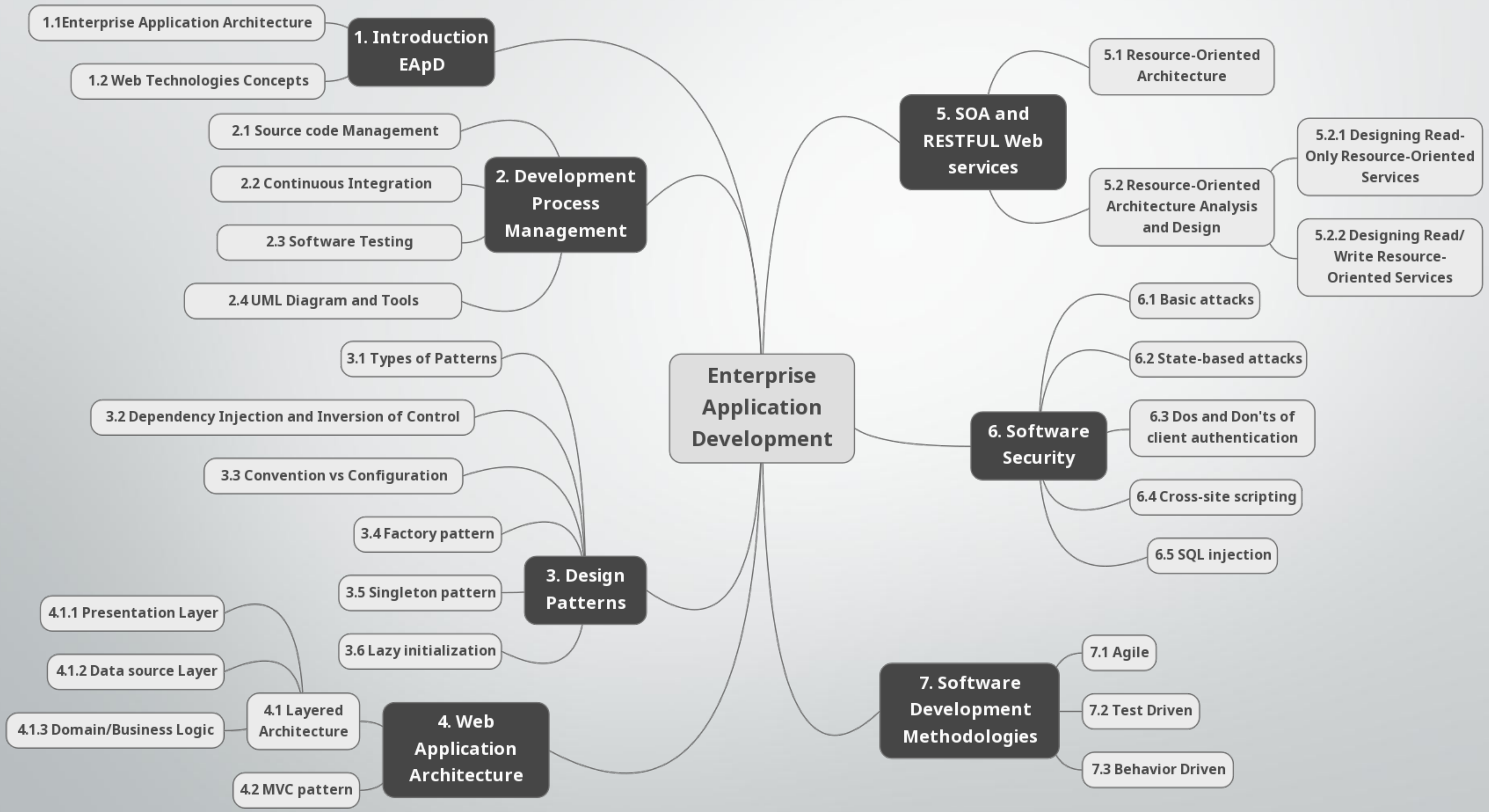

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