SoftwareEntwicklung ▸ Beratung ▸ Schulung

Branching Strategies

Usage of Branching Strategies within Software Development

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Agenda

1. Arguments against Branching
2. Without Branches
3. When do we really need Branches?
4. Why Branching Concepts?
5. Branching Concepts
6. Recipes for successful Branching/Merging
7. Pitfalls of Branching

1. Arguments against Branching

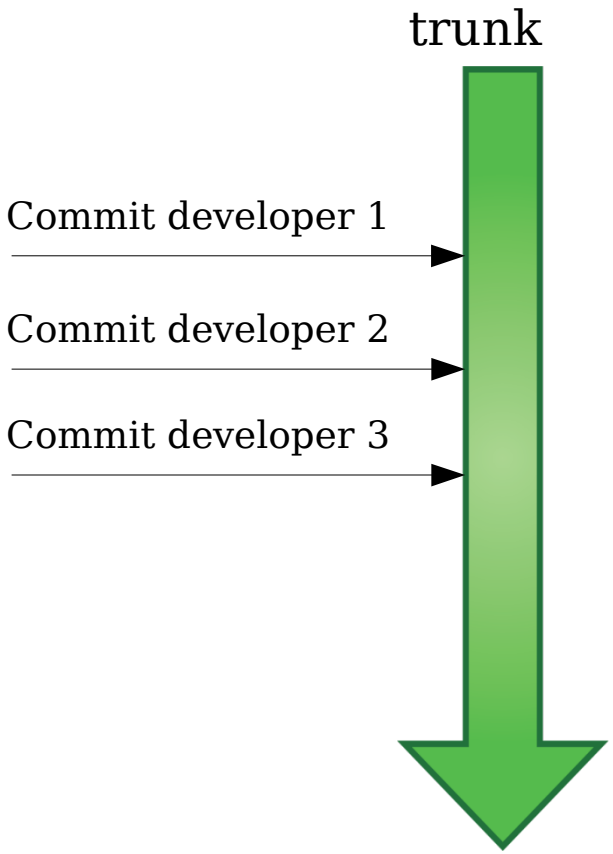
- We have a small project, so we don't need that.
- To complicated.
- There is no benefit on using Branching.
- We have already a Branching strategy ;-)
- What about conflicts?
- ....

2. Without Branches

- Let us make an experiment:
  - We assume to have a Version Control Tool (VCT) which does **not** support the concept of branching.
  - So we have **no branches at all.**

2. Without Branches

- This means we have only a single line of development.
- Let us think in Subversion terms „trunk“ for simplicity.
- Every developer has to commit on the same line.

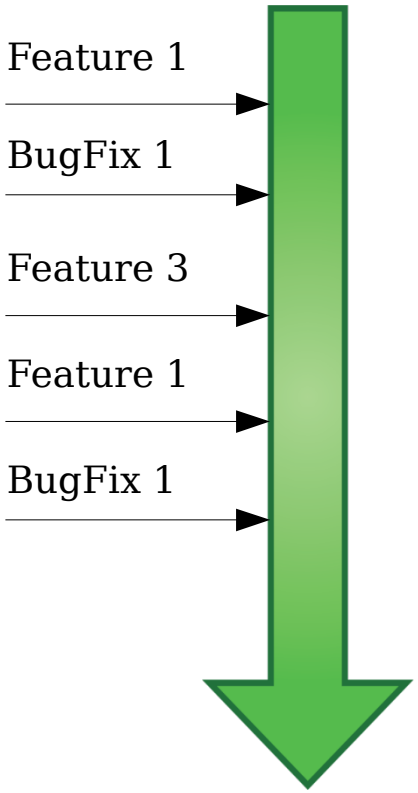


2. Without Branches Consequences

- What are the Consequences of the given scenario?
  - The environment for every developer is changing by every commit.
  - Code is not stabilizing
  - Release time points are problematic.
    - Mixture of code ready-for-production, bug fixing and feature implementation.

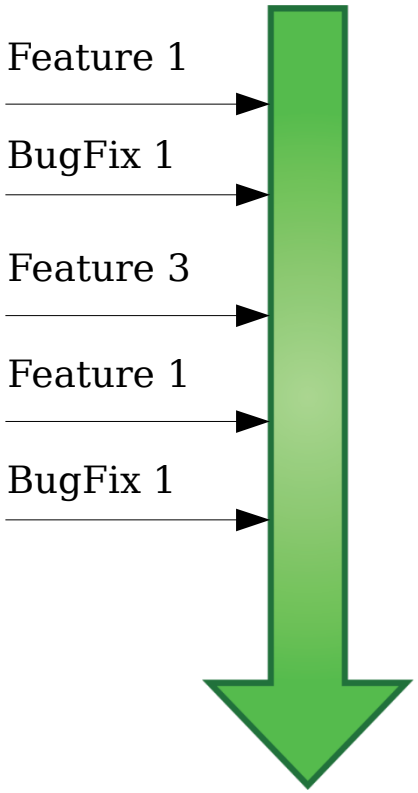
2. Without Branches Consequences

- The environment for every developer is changed by every commit.
  - This will leading to a commit policy:
    - Only commit if change has been ready
  - Prevent from commits!



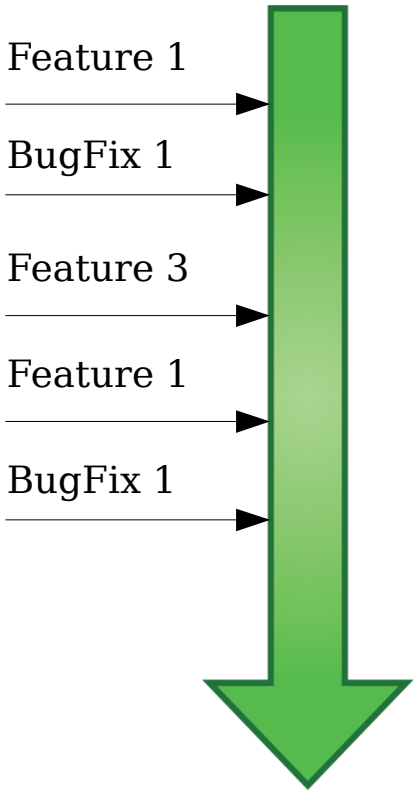
2. Without Branches Consequences

- Complex relationship between code changes and requirement/change management.
- This will make undoing of any changes more or less impossible.
- Defect analysis can be very complex.



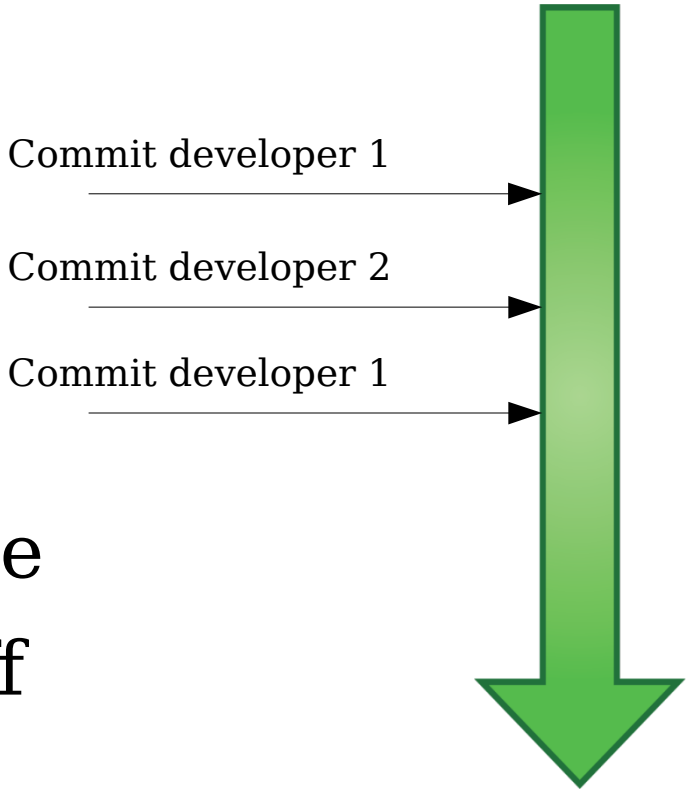
2. Without Branches Consequences

- Developers can not work on a Feature/Bug parallel.
- They will not synchronize with the repository, cause this can break their current work.
  - They have to solve conflicts instead of working on Features or Bugs.



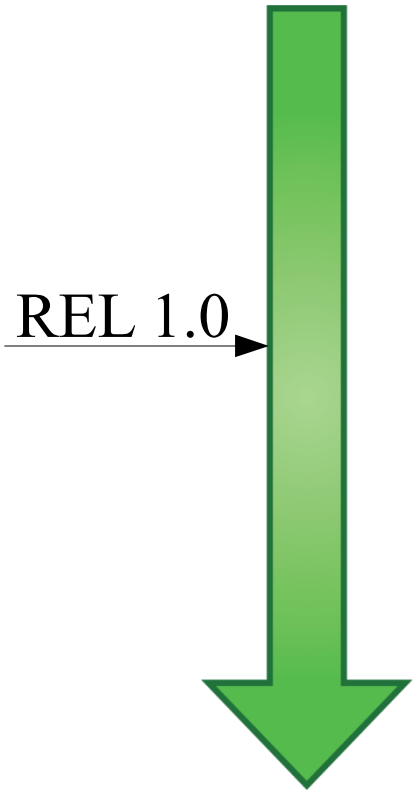
2. Without Branches Consequences

- Release Preparation:
  - Stop development!
  - Only Bug Fixing for Release is allowed
  - No parallel development possible
  - Code fixes to turn off non ready code.



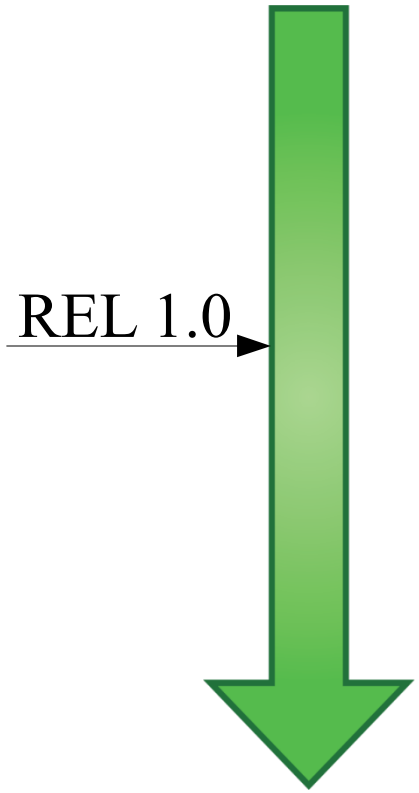
2. When do we really need Branches?

- We made an release (REL 1.0) and the customer is calling that a bug has been found.
  - We have to fix that bug as soon as possible and deliver a new release to the customer.



3. When do we really need Branches?

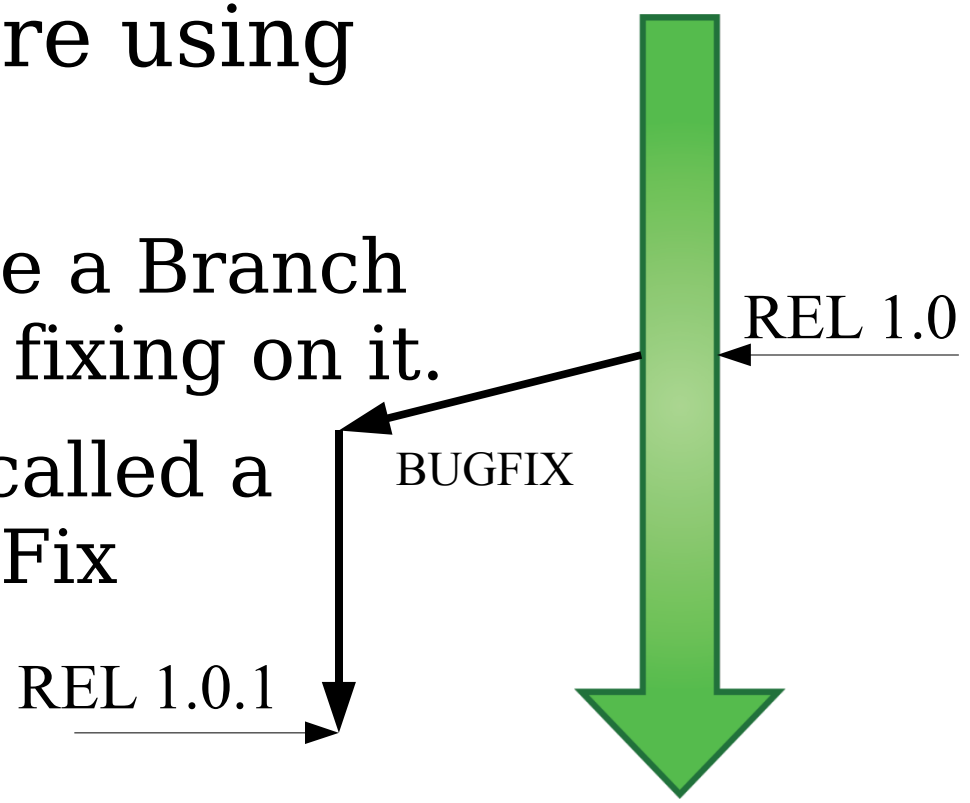
- If we have a VCT which does not support the concept of branches (independent how it is called) we are **really in trouble**.



Note:
RCS already supports branching (1985!)

3. When do we really need Branches?

- In real life we are using Subversion ;-)
  - We would create a Branch and do the Bug fixing on it.
  - This Branch is called a Hot-Fix or Bug-Fix Branch.



4. Branching Concepts Why?

- Why using Branching Concepts?
  - Change/Defect Management
  - Project/Release planning
    - Test, Integration Test, Q&A
  - Versions for:
    - Cross compiling, Operation System, GUI / Hardware.

4. Branching Concepts Why?

- Why using Branching Concepts?
  - Get a better relationship between Change/Defect Management and the changes made to the software.
  - Better informations for you and of course for the customers.

4. Branching Concepts Why?

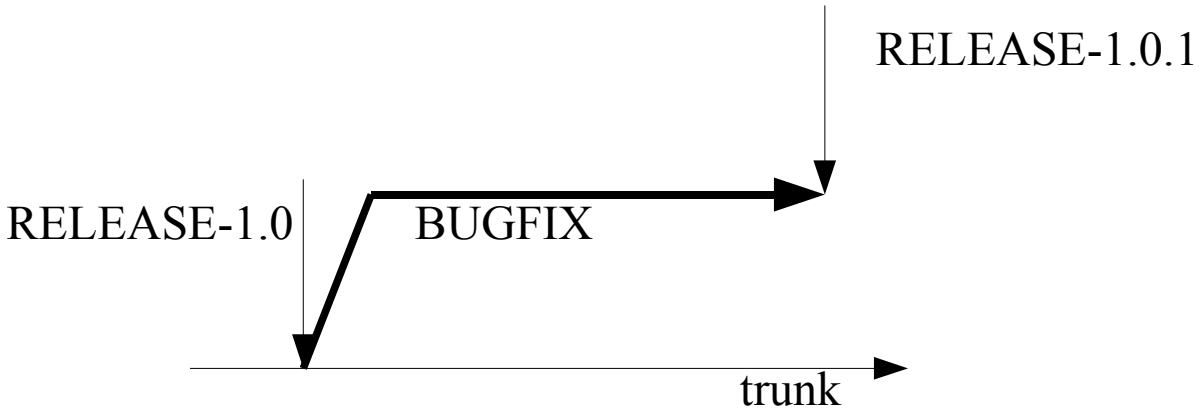
- Why using Branching Concepts?
  - Project/Release planning
    - Better identification of thinks which are comming into a release/milestone etc.
    - You can control what exactly is going into a particular release/milestone.
    - You can control the time when it's integrated into the release/milestone.

4. Branching Concepts Why?

- Why using Branching Concepts?
  - Cross compiling, Operation System, GUI / Hardware.
    - You can create Branches for particular operation systems
    - Hardware
    - GUI
    - etc.

5. Branching Concepts Bug-Fix Branching

- We create the Bug-Fix Branch based on the Release 1.0



5. Branching Concepts Bug-Fix Branching

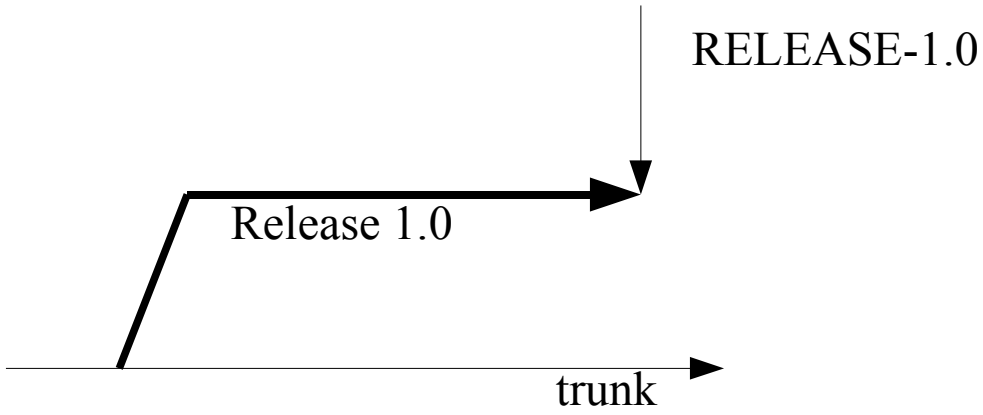
- Advantages:
  - Development (trunk) and bug fixing line are separated.
  - Separated deployment/delivery from development. So the fixed released can be delivered very fast to the customer.

5. Branching Concepts Bug-Fix Branching

- Disadvantages:
  - The trunk is of course unstable yet.

5. Branching Concepts Release Branching

- We define a point in time to start with the Release Branch as a preparation for a particular release (Feature Freeze).



5. Branching Concepts Release Branching

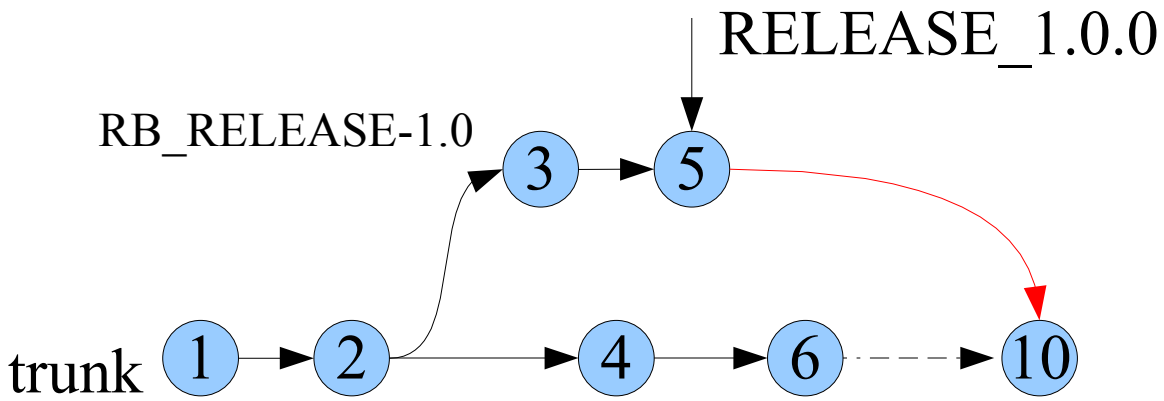
- Advantages:
  - Development (trunk) and release line are separated. There is no need to stop development on trunk.
  - Changes on the release line only affecting the release not the current development and vice versa.
  - Separated deployment/delivery from development.

5. Branching Concepts Release Branching

- Disadvantages:
  - The trunk is unstable
    - Mixture of Bug-Fixes / Features / Enhancements etc.
  - No good relationship between Change/Defect Management on the release line.
  - Undoing changes is not very simple.

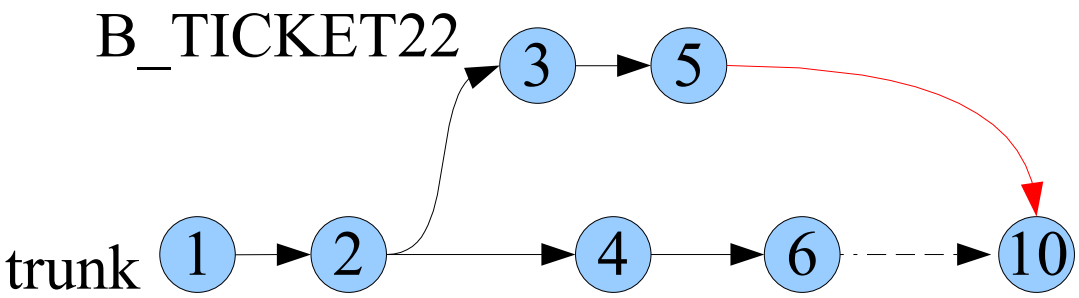
5. Branching Concepts Release Branching

- Don't miss to merge the changes back into the development line ;-)



5. Branching Concepts Issue Branching I

- Create a Branch for issues for example Bugs, Changes etc.



5. Branching Concepts Issue Branching I

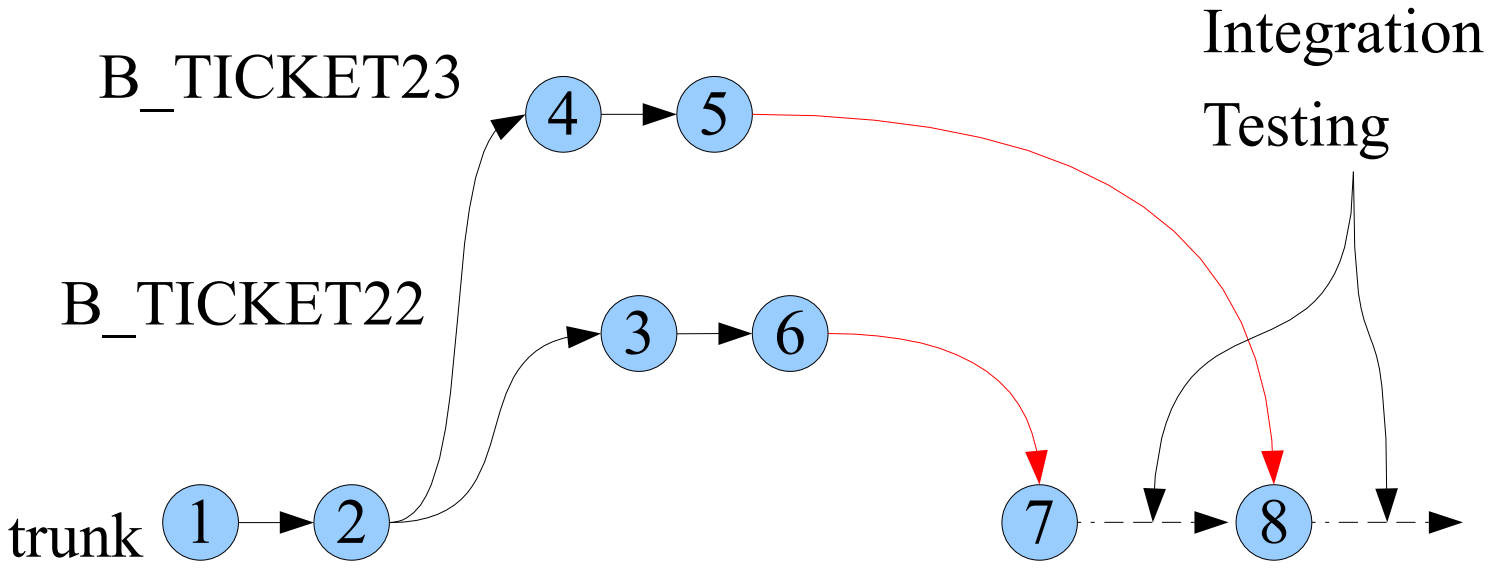
- Advantages:
  - Exact association between Code changes and Change/Defect Management for the created branches
  - Undoing of changes will be simplified on the “trunk”.

5. Branching Concepts Issue Branching I

- Disadvantages:
  - Unstable trunk
  - No good relationship to Change/Defect Management for the trunk.

5. Branching Concepts Issue Branching II

- Changes/Bug Fixes will be made by Branches **only**.



5. Branching Concepts Issue Branching II

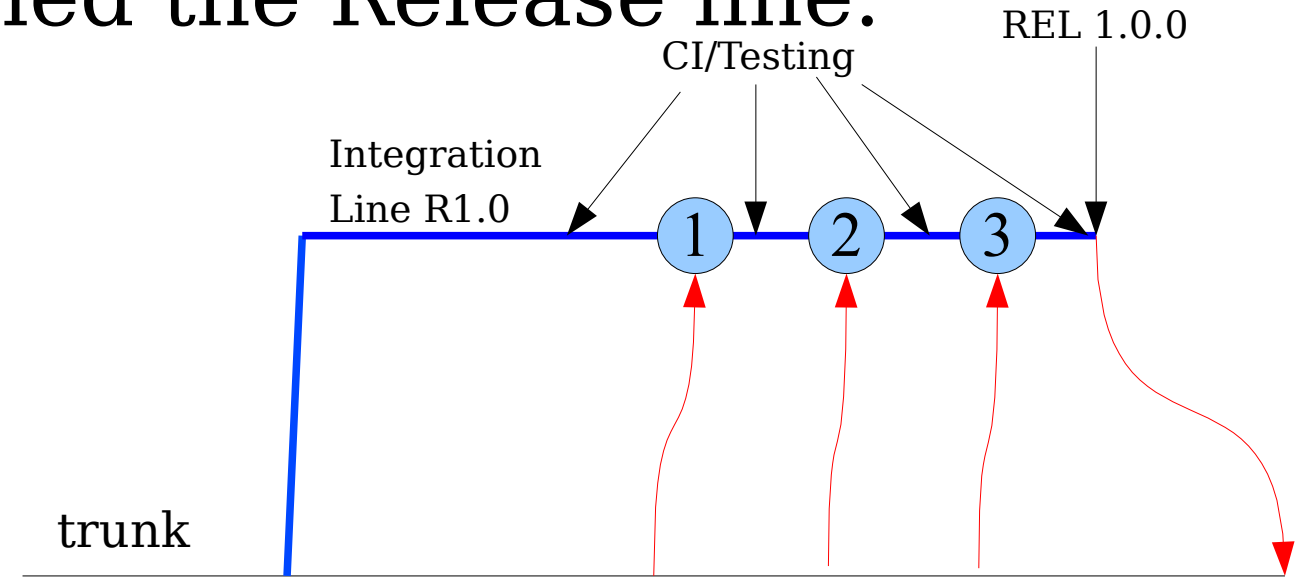
- Advantages
  - Very good relationship between Change/Defect Management either on the branches and what has been integrated into the “trunk”.
  - Analysing is simplified cause the problem can only occur at the integration point.
  - Simplifies undoing of changes.

5. Branching Concepts Issue Branching II

- Disadvantages
  - You have to be careful with code refactoring, cause changes in folder structure can be a nightmare during a merge.

5. Branching Concepts Integration/Dev Line

- Integration / Development Line
- The Integration line is sometimes called the Release line.



5. Branching Concepts Integration/Dev Line

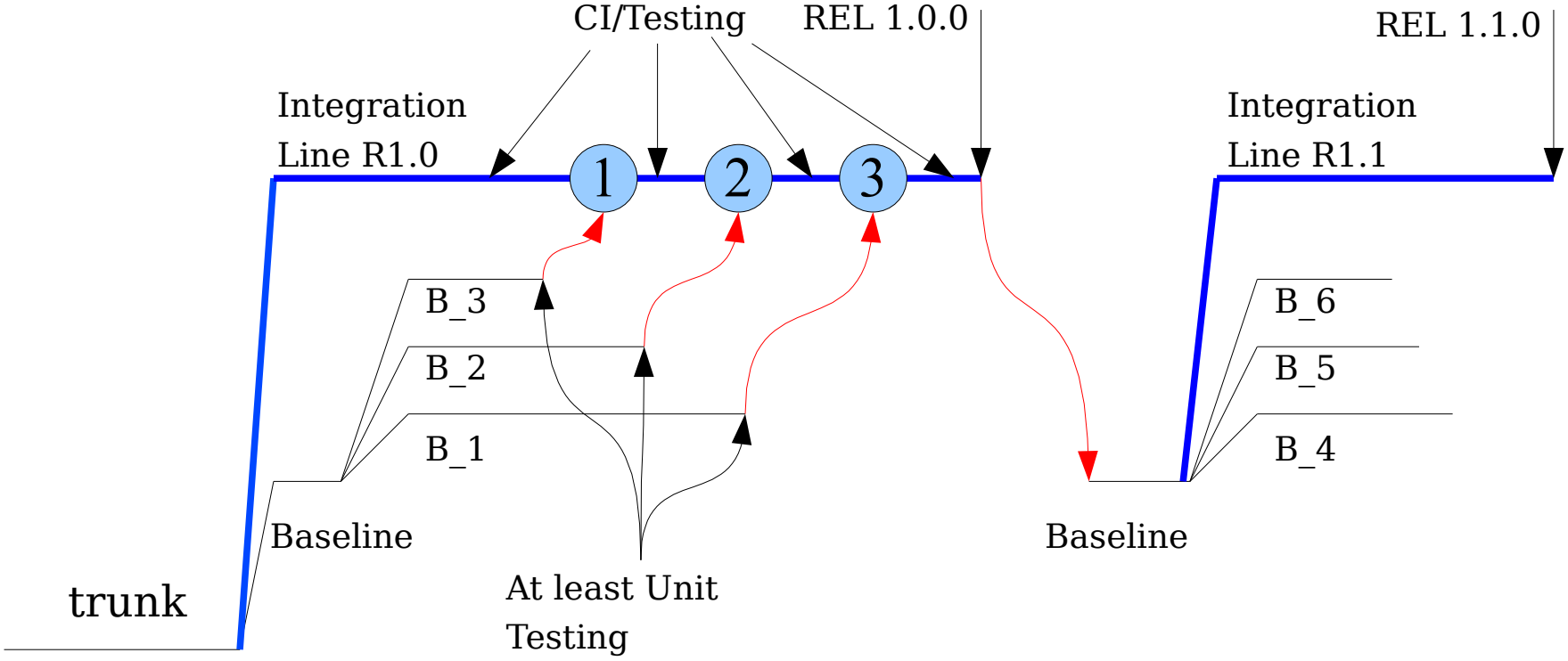
- Advantages
  - Separated development/deployment.
  - Parallel development and release line.

5. Branching Concepts Integration/Dev Line

- Disadvantages
  - Code stabilizing is not very good, cause you are integrating from an unstable code line „trunk“
  - Loosing relationship to Change/Defect Management

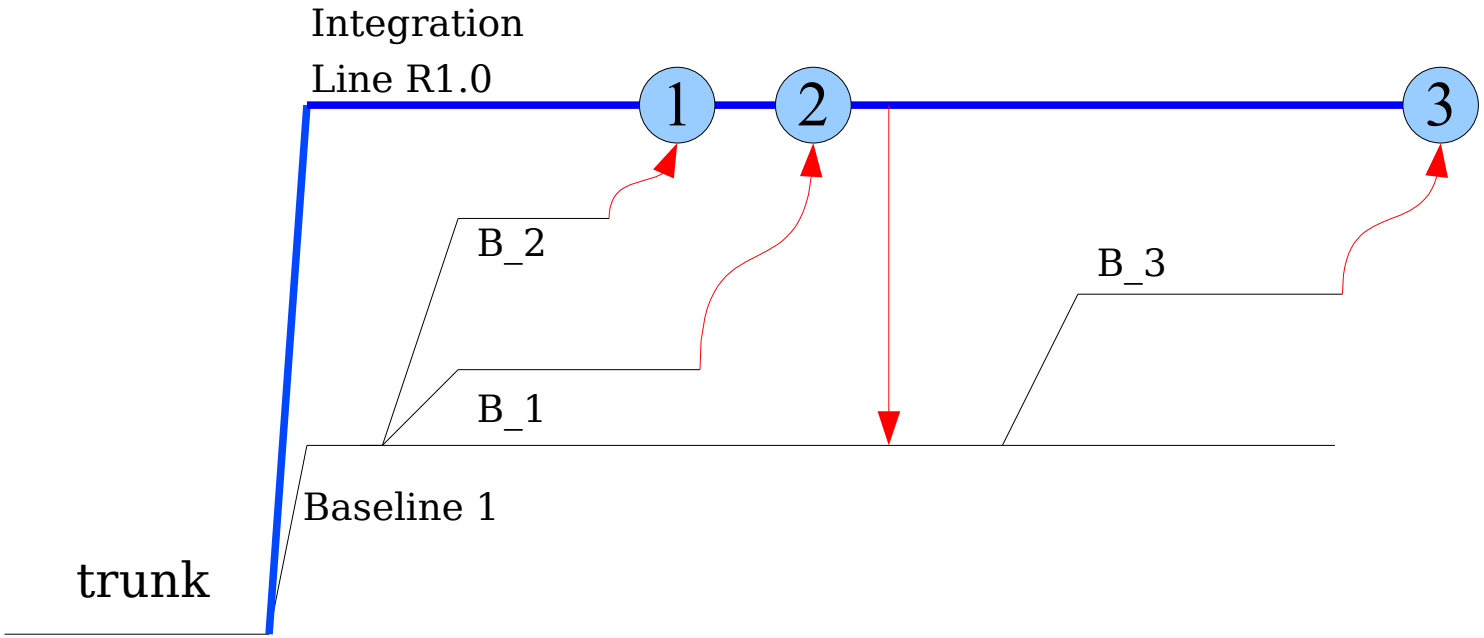
5. Branching Concepts Baselining

- Serialized Releases

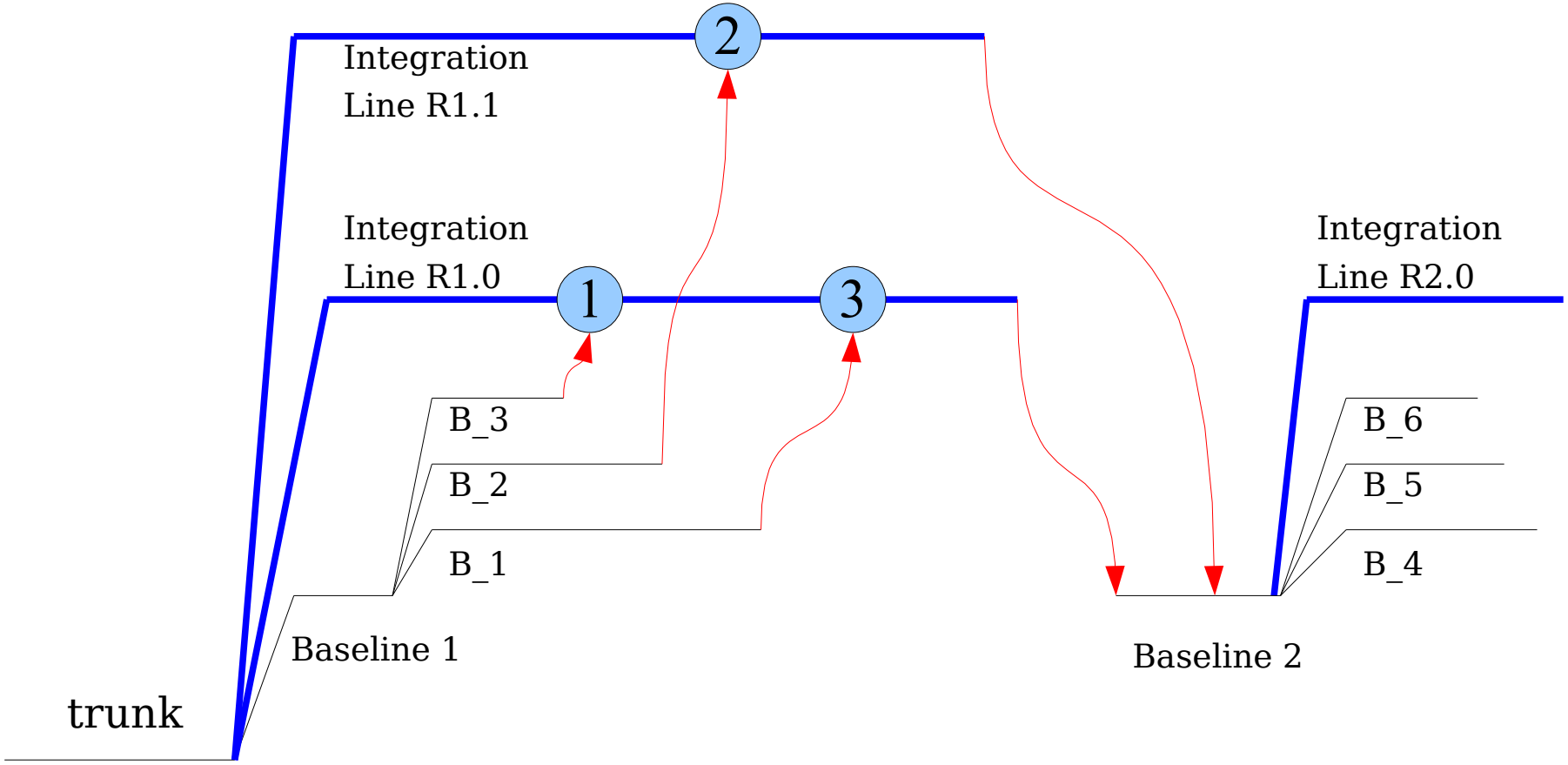


5. Branching Concepts Baselining

- With reintegration into Baseline from time to time.



5. Branching Concepts Baselining



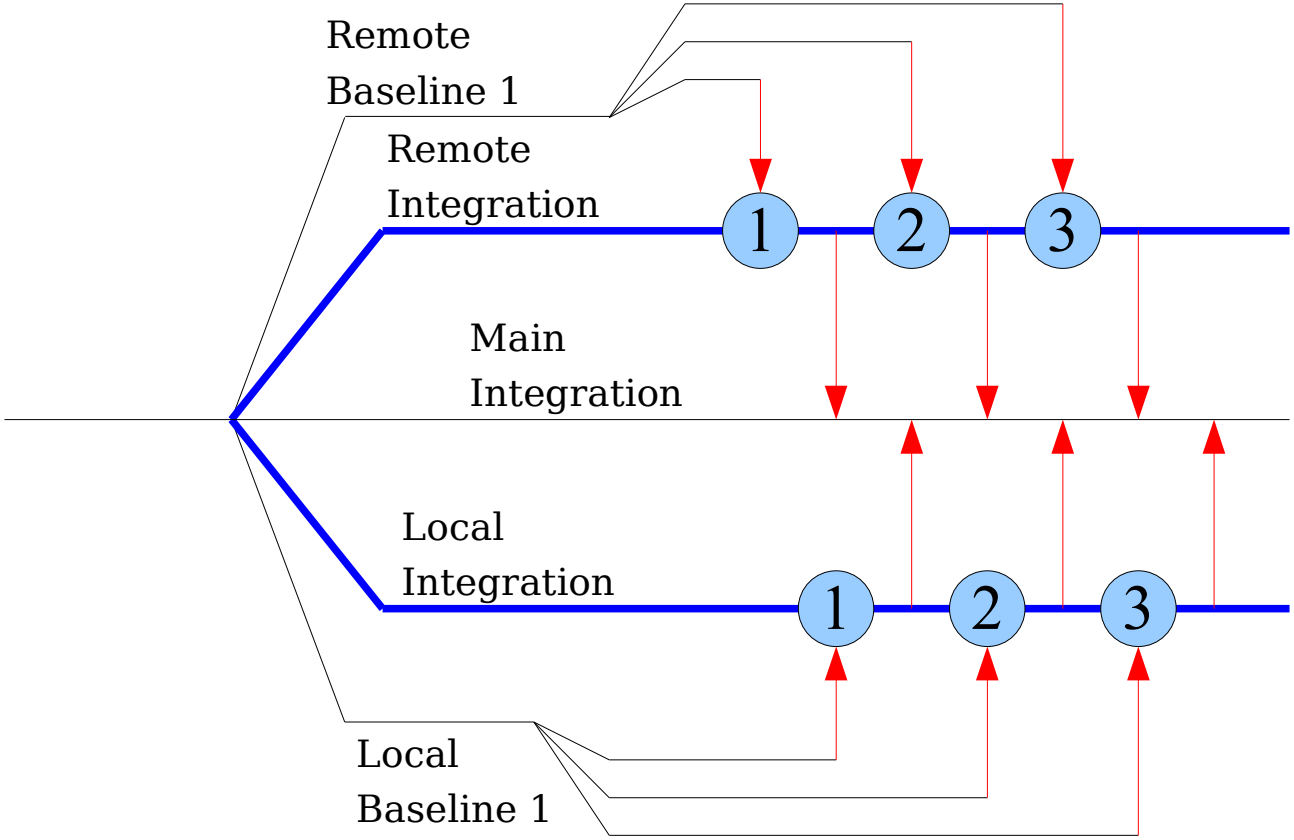
5. Branching Concepts Baselining

- Advantages
  - Exact association between change/defect Management and the branches
  - Stabilized Code line

5. Branching Concepts Baselining

- Disadvantages
  - May be problematic if code refactoring is needed.
  - Sometimes problems occur if branches depend on each other.

5. Branching Concepts Distributed Developm.



6. Recipes for successful Branching/Merging

- Before you think about a Branching concept, think about a **Merging** concept instead.
  - Who should do the merge?
    - The developers.

6. Recipes for successful Branching/Merging

- What should be part of the merging process?
  - Unit Tests
  - Integration Test
  - System Test
  - Continuous Integration (CI) which is triggered by commits can be a good support on the integration lines.

6. Recipes for successful Branching/Merging

- Think about your branching concept before project start. These concepts are part of the project planning phase.
- Do not write your branch concept in **stone**!
- Observe your experience with your branching concept and……
  - **If it is necessary just change it!**

6. Recipes for successful Branching/Merging

- Naming Conventions for branch names.
  - Very important

    Write it down instead of just thinking about it!

6. Recipes for successful Branching/Merging

- Naming Conventions for Branches:
  - Integration Line (IL_...)
    - Release number as supplemental (IL_RELEASE-1.0.0)
  - Bug Fix Branches (BFB_...)
    - Bug tracker id should appended (BFB_TICKET31)

6. Recipes for successful Branching/Merging

- Naming Conventions for Branches:
  - Feature Branches (FB_...) (FB_TICKET66)
  - If you have different tools for Change Management and Bug Tracking, add the information too.
    - For example FB_CMTICKET42

6. Recipes for successful Branching/Merging

- In Subversion...
  - Create sub folders in the branches directory
    - integration, bugfixes, features
  - May be for the tags folders is needed the same
    - Build Tags etc.

6. Recipes for successful Branching/Merging

- My final Statement:

  No Unit Tests No Branching!

- But the better Statement is:

  No Unit Tests No Merging!

7. Pitfalls of Branching

- Not merged for a long time.
  - This can result in many conflicts during a following merge.
    - Reduce branch life time
    - Make reintegrations from time to time.
    - Change your Branching Concept

7. Pitfalls of Branching

- Branch-oholic
  - Branch at all costs.
    - May be you have not invested enough effort into a „Branching/Merging Concept“ (Software Configuration Plan).

On-line Sources I

- [1] Brad Appleton's Streamed Lines: Branching Patterns for Parallel Software Development
  - http://cmcrossroads.com/bradapp/acme
- [2] UCM Branching Strategies
  - http://www.snuffybear.com/ucm_branch.htm
- [3] Branching and Merging Primer
  - http://msdn.microsoft.com/en-us/library/aa7308

On-line Sources II

- [4] Branching Strategy Questioned
  - http://blogs.open.collab.net/svn/2007/11/branch
- [5] Parallel Branching Strategies in Software Configuration Management
  - http://whitepapers.techrepublic.com.com/abstra
- [6] Distributed Version Control Systems: A Not-So-Quick Guide Through
  - http://www.infoq.com/articles/dvcs-guide

On-line Sources III

- [7] Homepage of Subversion
  - http://subversion.tigris.org
- [8] Book about Subversion
  - http://www.svnbook.org
- [9] Subversion Forum
  - http://www.svnforum.org
- [10] German Subversion forum
  - http://forum.subversionbuch.de

On-line Sources II

- [11] Forum for Software Configuration Management
  - http://www.xing.com/net/skm
- [12] The SKM Wiki (german)
  - http://www.skmwiki.de

Questions?

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- Thank you for your attention.