Project Organization
vs.
Build- and Configuration Management

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Agenda

1. Initialization
2. Specification
3. Implementation
4. Project Evolving
5. Organization
6. Building Software
7. Dependencies
8. Build Systems
9. Feature Implemenation

10. Conclusion

1. Initialization

- **Efforts, requirements and resources will be planned**
  - Implementation efforts
  - Test efforts
  - etc.

1. Initialization

- **Human resources**
  - How many developers?
  - How many testers?
  - How many Q&A?
  - How many people for operations?
  - etc.

1. Initialization

- **Hardware resources**
  - **How many computers for developers?**
  - **How many computers for testers?**
  - **How many Q&A computers?**
  - **How many computers for operations?**
  - **etc.**

2. Specification

- – **Many documents will be produced**
  - • **Architecture Documents**
  - • **Design Documents**
  - • **Test Plans**
  - • **etc.**

3. Implementation

- The implementation phase starts with a „small" number of developers.

- The „small" number of developers needs something to build the software, cause they want to do some tests.

  - They start with their IDE for that purpose.

4. Project Evolves

- – **Over the time more and more developers join the team.**
- – **Now some kind of organization on the source code level must be introduced.**

5. Organization

– **The requirement by the developers is to work as independent as possible without any impediments from others.**

- **The idea of „Modules" will be born.**
- **The source tree will be organized based on that.**

5. Organization

– **Requirements will be organized based on the modules**

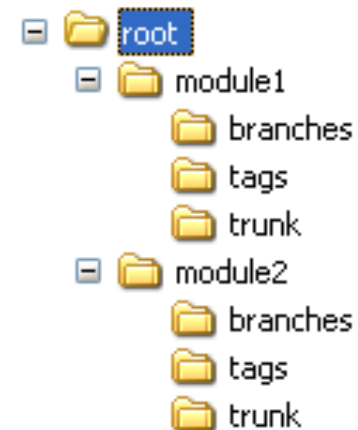- **Every Module-Team will implement the given requirements**

5. Organization

The following Subversion structure will be the result:
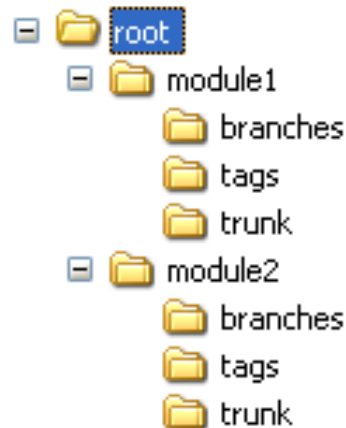
6. Building Software

How to build a defined state of the software based on the given structure?

- **Build a particular tag of the modules?**
- **Which tags should be used?**

6. Building Software

- – **What you need is a solution to describe a state of your software system.**

6. Building Software

- The following describes a state of your application:
  - Module1
    - Release 1.2.3
  - Module2
    - Release 1.1.6

6. Building Software Solution I

Introduce some description of what a system is defined by a supplemental file, let us call it „release.xml" and store it into release/trunk
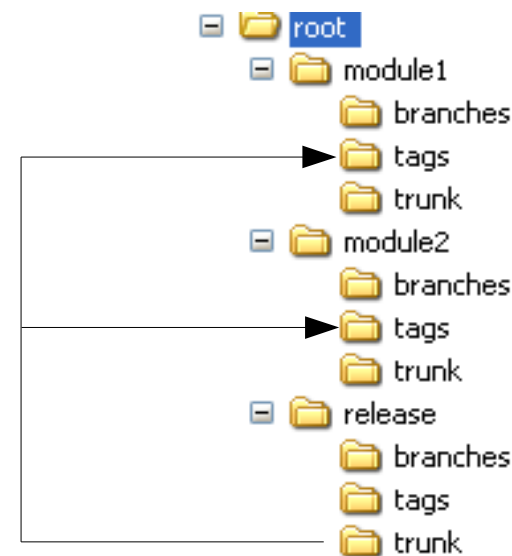
6. Building Software Solution I

Pro's

- – **No change of the current structure needed.**

- – **Simply to integrate modules which results in simply changing the contents of the release.xml file.**

6. Building Software Solution I

Con's

- – **No commit on system level possible only per module.**

- – **No branching on system level possible only per module.**

- – **No merging on system level possible only per module.**

- – **release.xml file is hand maintained.**

6. Building Software Solution I

Con's

- Checkout of the whole system only possible by using supplemental tools (may be self implemented).

- An integration is not really „integrated", cause no merge has been done.

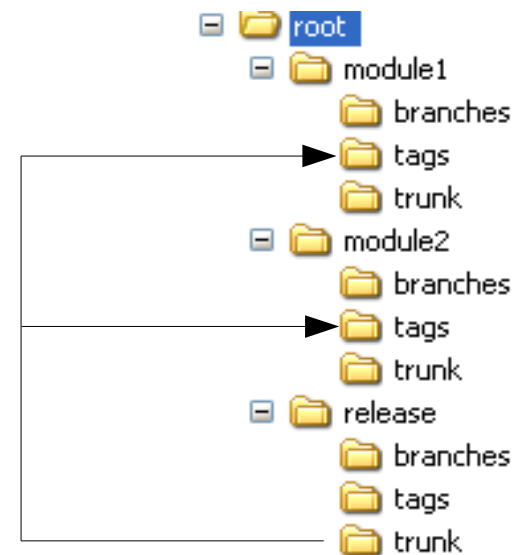# 6. Building Software Solution I

Con's

- – **No support of existing tools for such approach.**

6. Building Software Solution II

Introduce some description of what a system is defined of via svn:externals:

6. Building Software Solution II

Pro's

- – **No change of the current structure needed.**

- – **Checkout of the whole project simple.**

- – **Tagging can be done via svn commands.**

6. Building Software Solution II

Con's

- – **No commit on system level possible only per module (limitations of svn:externals).**

- – **No branching/merging on system level possible only per module.**
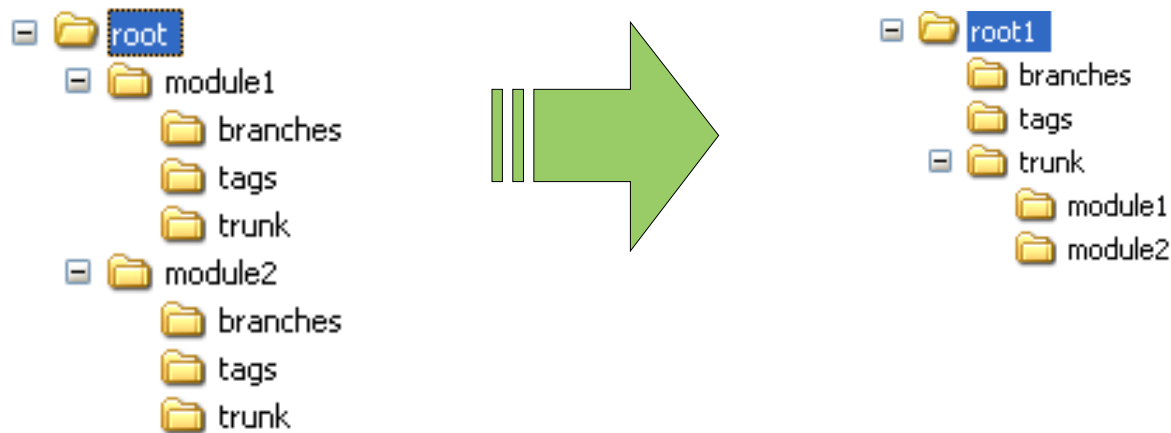
- – **svn:externals are hand maintained.**

6. Building Software Solution II

Con's

- – **No comparison between releases on system level possible only per module.**

- – **No use of svn log --use-merge-history possible**

6. Building Software Solution III

Change the structure of your project according to "best practice" which is recommended in Subversion:

6. Building Software Solution III

Con's

- – **Changing of the structure is needed.**

- – **You have to define a branching strategy:**

  - • **Integration lines, Release lines etc.**

  - • **Branching on system and module base etc.**

6. Building Software Solution III

Pro's

- – **Checking out of the whole project is simple.**
- – **Tagging/Branching/Merging can be done via svn commands.**
- – **svn log --use-merge-history can be used.**

7. Dependencies

What about the dependencies between the modules?

- **Module1 depends on Module2?**

7. Dependencies

Solution I, II and III:

- **Couldn't handle this, because dependencies between the modules are not handled by the „release.xml" file nor by svn:externals property.**

- **Note: A dependency could be a pre-build, provided or runtime dependency.**

7. Dependencies

Solution I, II and III:

– **Result:**

   • **You have to introduce a new file in the modules like „dependency.xml" which describes the pre-build dependencies for each module.**

8. Build Systems

What kind of build system do you need?

- Maven, Gradle, Ant (+Ivy),
- CMake, SCons, Make…
- Self made ?

8. Build Systems

Maven, Gradle(?)

- – **Build Life cycle**
- – **Dependency Management on module level**
- – **Deployment, Repositories, Versioning system**
- – **Release cycle**

8. Build Systems

Ant (+Ivy)

- – **Dependency Management on module level**
  - • **Maven like**
- – **Only target driven**

8. Build Systems

CMake, SCons(?), Make…

- – **No dependency management on module level.**
- – **No deployment**
- – **SCons some kind of repository**

9. Feature Implementation

How to implement features in solution I and II?

- – **In fact not possible only on module level but not on system level.**

- – **The integration is done later via an integration build.**

9. Feature Implementation

How to implement features in solution I and II?

- – **Branching only on module level possible.**

- – **If you have many features in different modules you have a „Big Bang"-Integration or „puzzle-integration"**

9. Feature Implementation

How to implement features in solution I and II?

- – **"Continous Integration" (CI) NOT possible.**
  - **Only on module level but NOT on system leven.**

9. Feature Implementation

How to implement features in solution III ?

- – **Simply create a feature branch to implement it. Later merge into a release/integration line.**

- – **Integration can be done simply by using a merge and a following build.**

10. Conclusion Solution I, II

- Module based development not feature oriented.

- Not possible to merge on a application level only on module level.

- No view in VCS on the whole system.

10. Conclusion Solution III

- Feature oriented development simply possible by using branchin strategy.

- Tagging/Branching/Merging on application level via SVN.

- A complete view in VCS on the whole system.

On-line Sources I

- – **[1] Branching strategies**
  - • **Subversion Conference 2008**
- – **[2] Maven**
  - • **Linux Tag Berlin 2009**
- – **[3] Continous Integration**
  - • **Hudson**

Questions?

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Thank you for your attention.