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Tools and technology usage in PFMS application lifecycle management process

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October, 2015

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Agenda

- ✓ General principles of Application Lifecycle Management
- ✓ FAS approach to Application Lifecycle Management
- ✓ Discussion (Questions And Answers)

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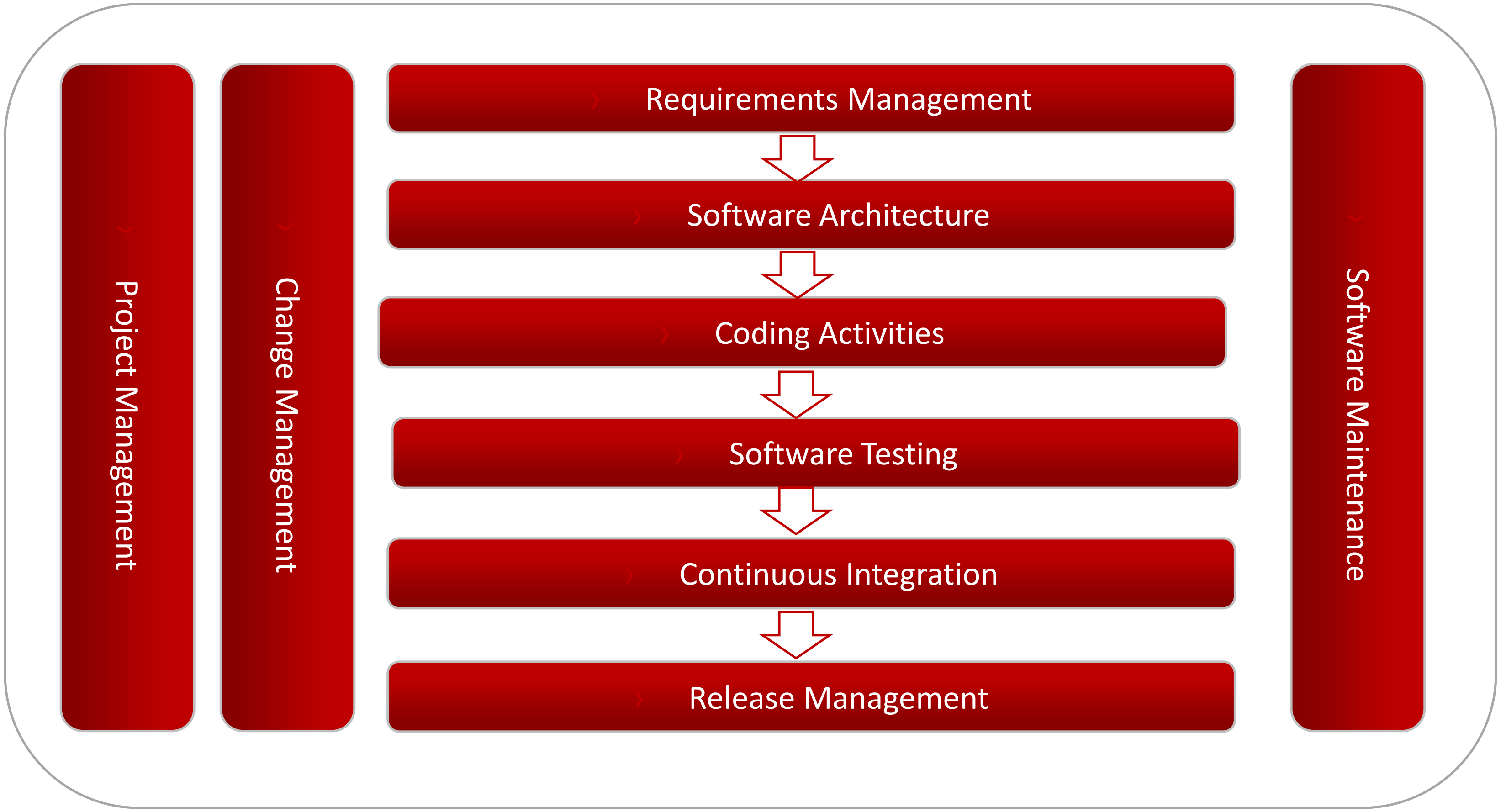
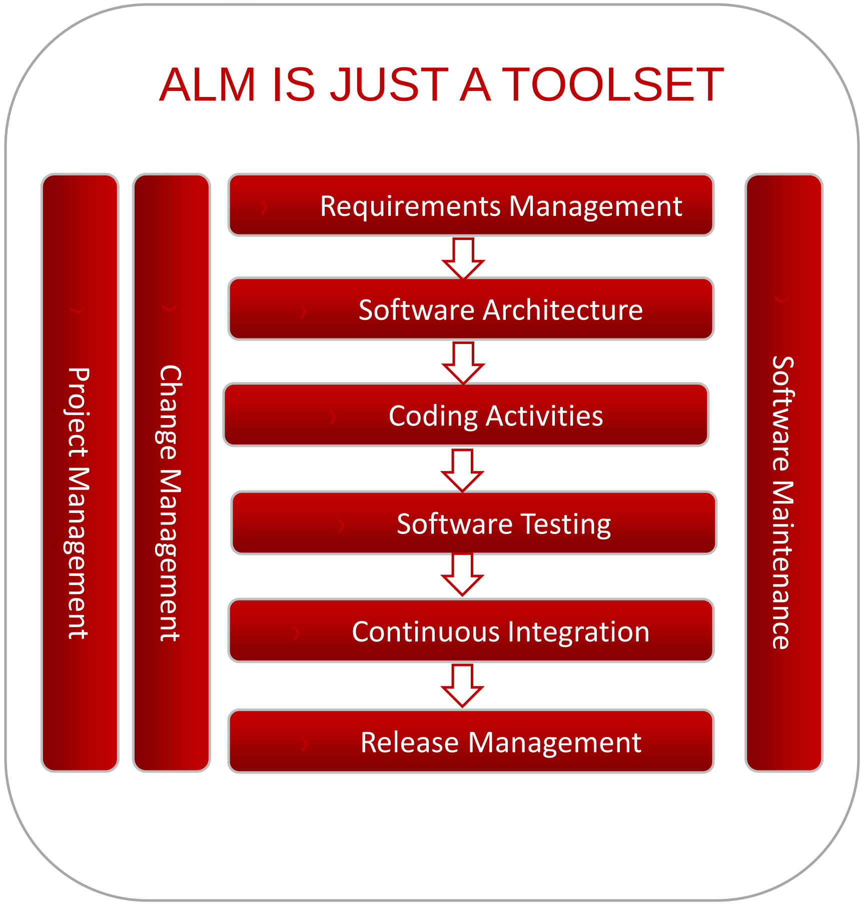
Application Lifecycle Management – Definition

Application lifecycle management (ALM) covers product lifecycle management (governance, development, and maintenance) of application software.



Application Lifecycle Management – Mindsets



- ALM is not a methodology or process guidance
- ALM is set of tools (from perspective of our vendor)
- Various management templates are incorporated into environment, but
- A fool with a tool is still a fool (ITIL citation)
- Process development activities are still required to maintain software development process (will be covered later)

Application Lifecycle Management – Challenges

Software developers share common challenges. Some of these challenges include the following:

- Tool integration problems
- Poor collaboration
- Segmentation of roles
- Bad reporting
- Lack of process guidance
- Bad Testing
- Communication problems

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Application Lifecycle Management – FAS approach

- Toolset Vendor: Microsoft (There are a lot of other competing toolsets on the market)
- Toolset: Visual Studio, Team Foundation Server
- Current version: 2012. Planned upgrade: 2015
- Founding principles, behind capabilities of selected toolset:
  - Productivity
    - Collaboration
    - Manage complexity
  - Integration
    - Integrated tools (IDE)
    - Role-specific tools
    - Visibility
  - Extensibility
    - Team Foundation Core Services API
    - IDE extensions

Application Lifecycle Management — FAS approach

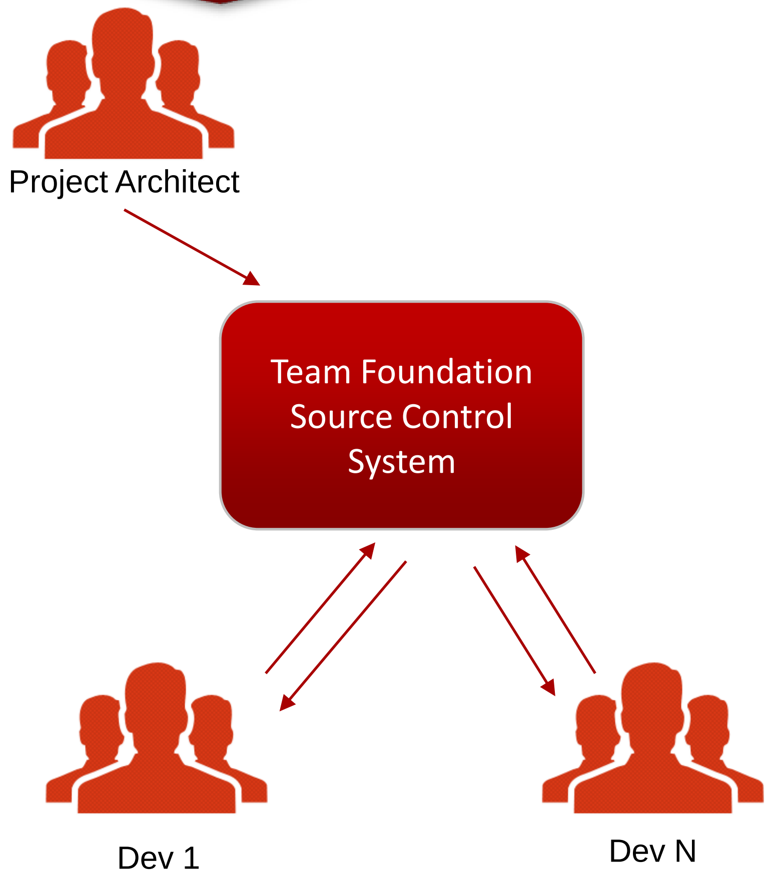
Team Foundation Server

- Project management and planning
- Work item tracking (WIT)
- Version control
- Test case management
- Build automation
- Reporting
- Virtual lab management

Application Lifecycle Management — Source (Version) Control: Basics

- “In computing, source code is any collection of computer instructions written using some human-readable computer language, usually as text.” (Wikipedia).
- So source code is just a text
- If you are a developer you live in a world of source code. And you need to somehow manage hundred of thousands lines of code
- “A component of software configuration management, version control, also known as revision control or source control, is the management of changes to documents, containing source code” (Wikipedia)
- If two developers work on the same file, how do you merge their code?
- How do you prevent accidentally overwriting files?
- So source control is advanced system, that is used to coordinate activities between developers. It is part of “collaborative” features of Team Foundation Server

Application Lifecycle Management — Source Control: Basic Operations



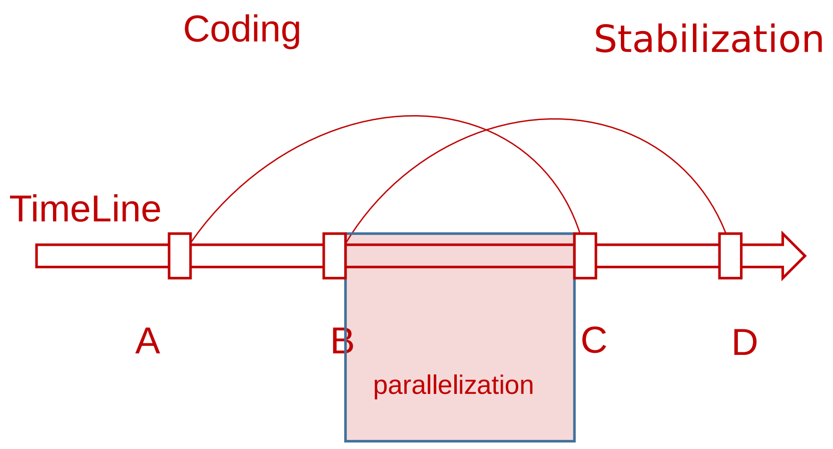
- Project Architect defines basic structure of solution and "uploads" it to Source Control system (shares it with group members)
- Developers download this shared source files on their machines, using Team Foundation functionality, integrated into Visual Studio
- Code is added or modified on developer's computer. "Check-out" is used to make file editable and mark it as changed on source control
- When work is complete, code is then "checked-in" to source control using special groups of modified versions of files: "change-sets"
- Conflicts between changes are resolved by developers, using special tools and TFS functionality, integrated in Visual Studio

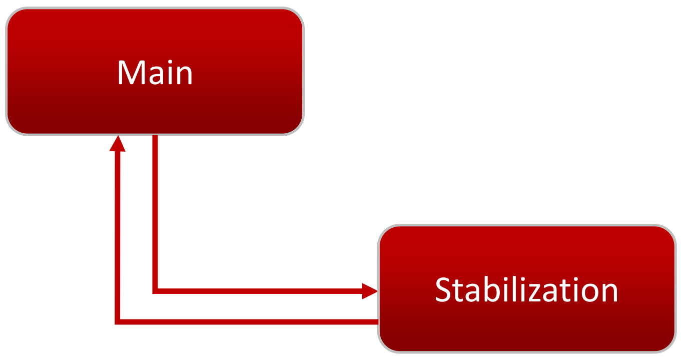
Application Lifecycle Management — Source Control: Basic Features

- Atomic check-ins
- Associate check-ins with work items
- Branching and merging
- Shelving
- Labeling
- Concurrent check-outs
- Follow history
- Check-in policies
- Check-in notes
- **Team Foundation Server proxy*

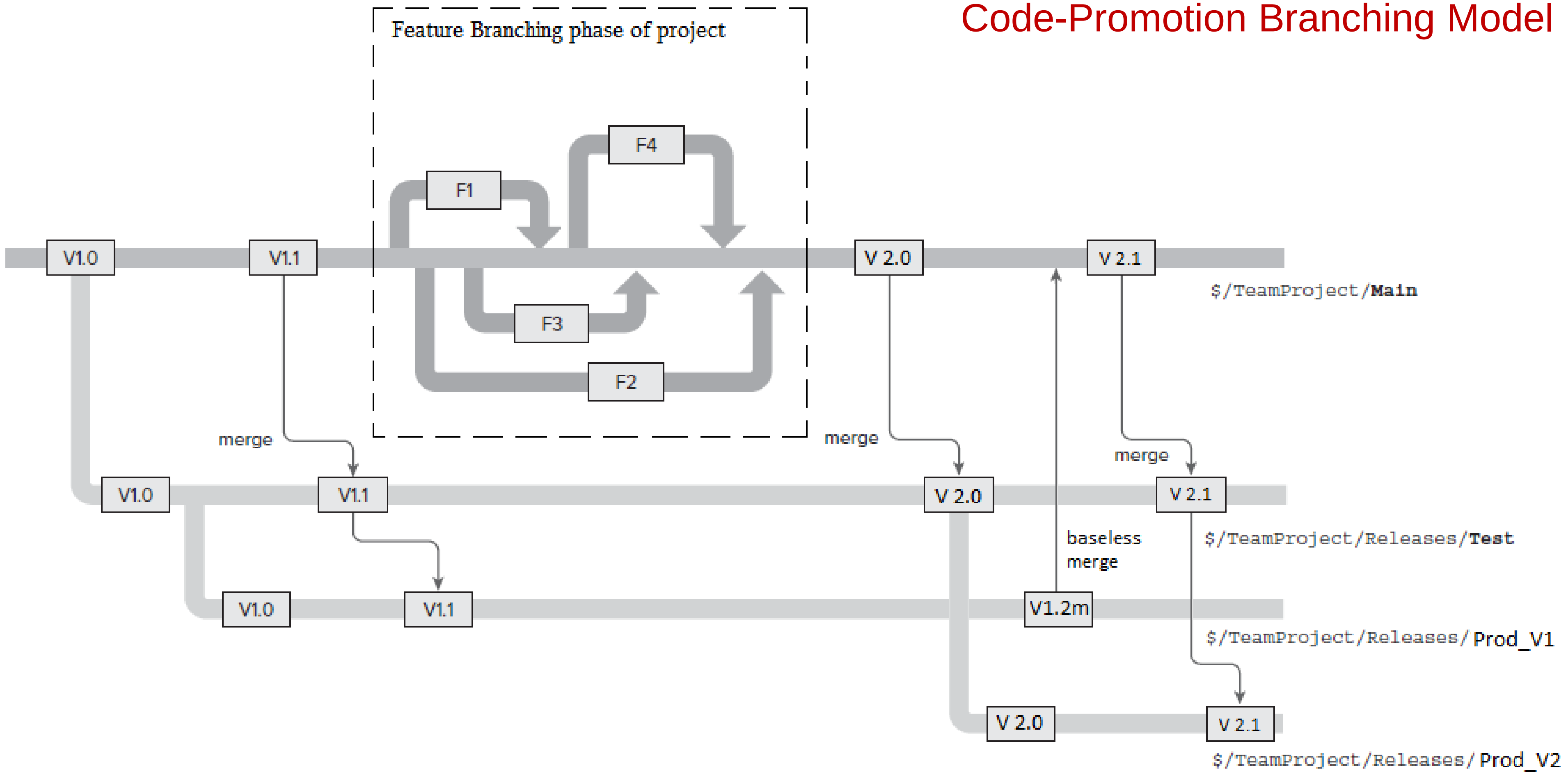
Application Lifecycle Management — Source Control: Branching

- What if you need to have two different versions of source code at a time ?
- Let say group works on bug fixes of current planned iteration, but due to deadline tries to use remaining development time for coding activities of next iteration
- You need “branch”: copy of a set of files in a different part of the repository that allows two or more teams of people to work on the same part of a project in parallel.
- A “merge” is the process of taking code in two branches and combining it back into one codebase.





Code-Promotion Branching Model


Feature Branching phase of project
F1
F2
F3
F4
V1.0
V1.1
V 2.0
V 2.1
$/TeamProject/Main
merge
merge
merge
V1.0
V1.1
V 2.0
V 2.1
$/TeamProject/Releases/Test
baseless merge
V1.0
V1.1
V1.2m
$/TeamProject/Releases/ Prod_V1
V 2.0
V 2.1
$/TeamProject/Releases/ Prod_V2

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Application Lifecycle Management — Source Control: Build

- Developer produces source code, but software needs to be built (compiled) to get working machine code (binaries) that can be tested and deployed
- What if application software is hard to build on local computer ?
- What if it needs a lot of separate component to be deployed in test environment to perform testing ?
- What if software is so complex and mission-critical, that existing regress possibility is not acceptable and should be minimized ?
- What if software publishing to test environment takes too much developer's time and produces too much errors ?
- Team Foundation Build and Lab Environment helps to solve most of this problems. This technique is called Build-Deploy-Test (BDT) workflow and is used by FAS development team on daily basis
- It is example of Continuous Integration, Build Automation and Software Testing capabilities of Team Foundation Server

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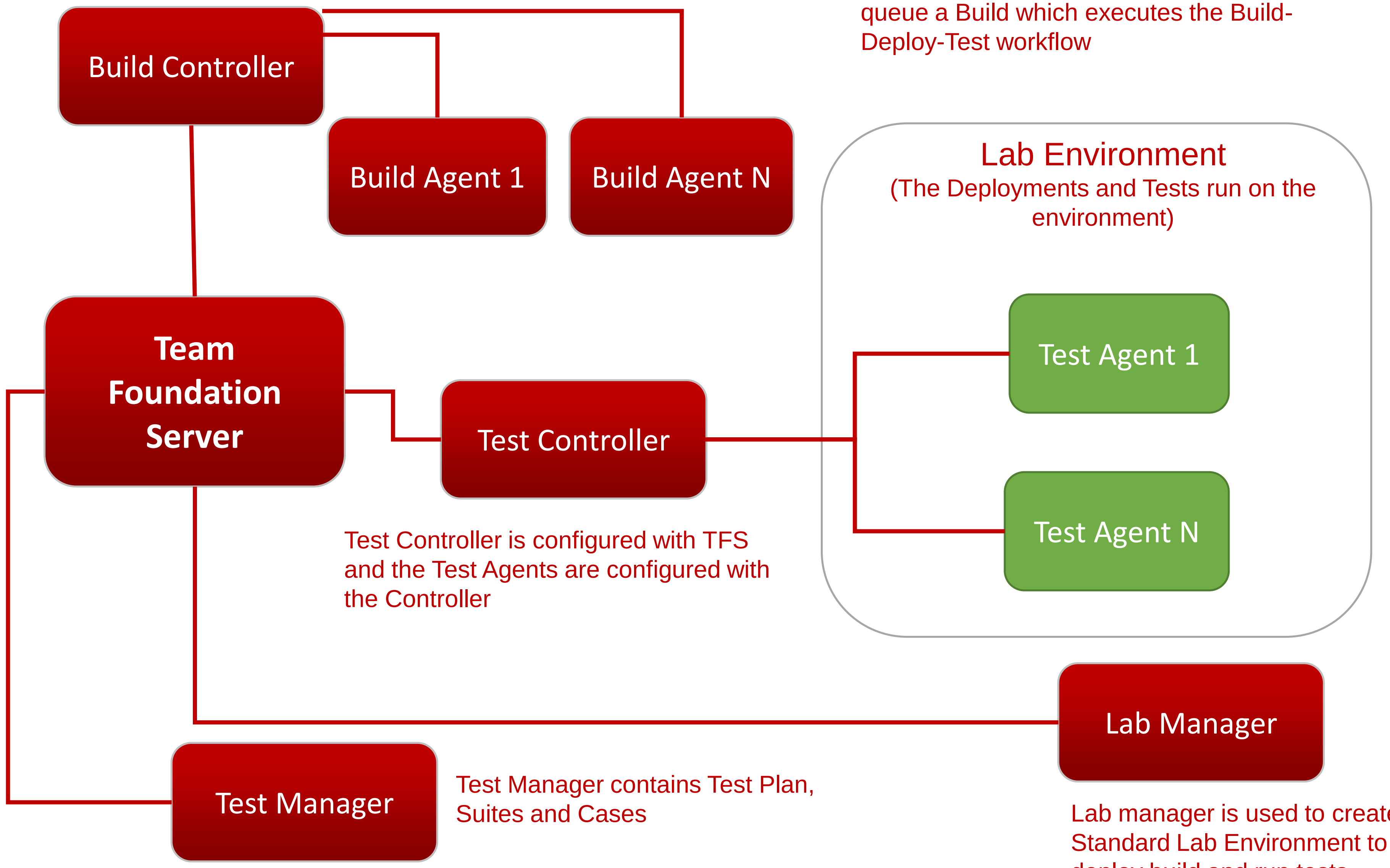
Application Lifecycle Management — Source Control: BDT



The Build Controller and Agents are used to queue a Build which executes the Build-Deploy-Test workflow

Test Controller is configured with TFS and the Test Agents are configured with the Controller

Test Manager contains Test Plan, Suites and Cases

Lab manager is used to create Standard Lab Environment to deploy build and run tests

Application Lifecycle Management — Source Control: BDT Summary

- BDT environments are organized per project collection
- Every current project is equipped with BDT environment
- There are over 30 virtual servers currently used for BDT
- Testing Part of BDT process is automated using Microsoft Testing Framework. FAS uses dedicated sub-unit of software department to manage test automation for all current projects. Test scenario automation is similar to regular coding process.
- Continuous integration, automatic testing are part of day to day activities
- Test results (Debug information, Screenshots, Videos) are delivered to investigator via TFS Infrastructure
- Described process (BDT) is highly dependent on Code Promotion project organization
- All of described activities are formalized as part of FAS software development processes

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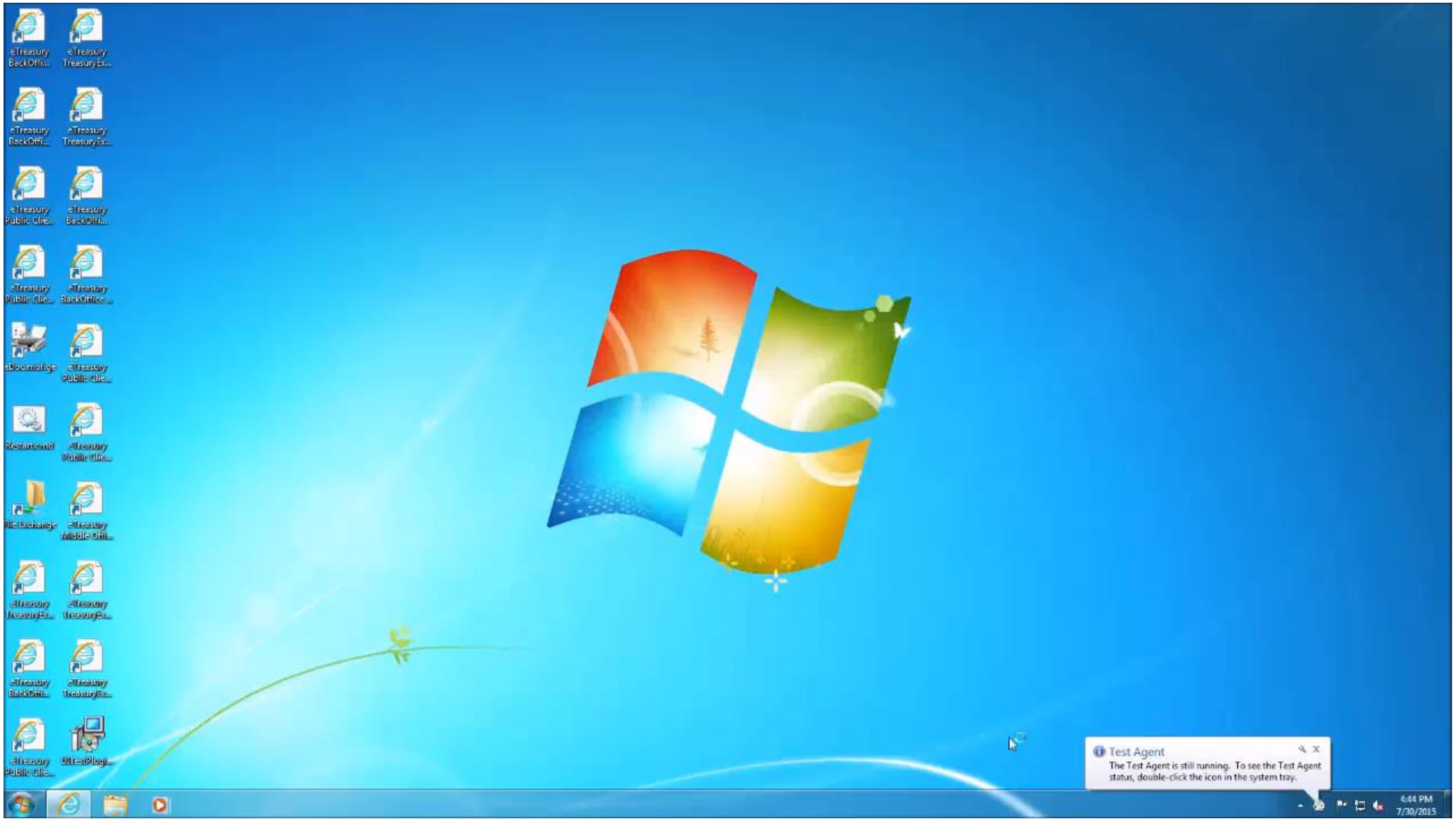
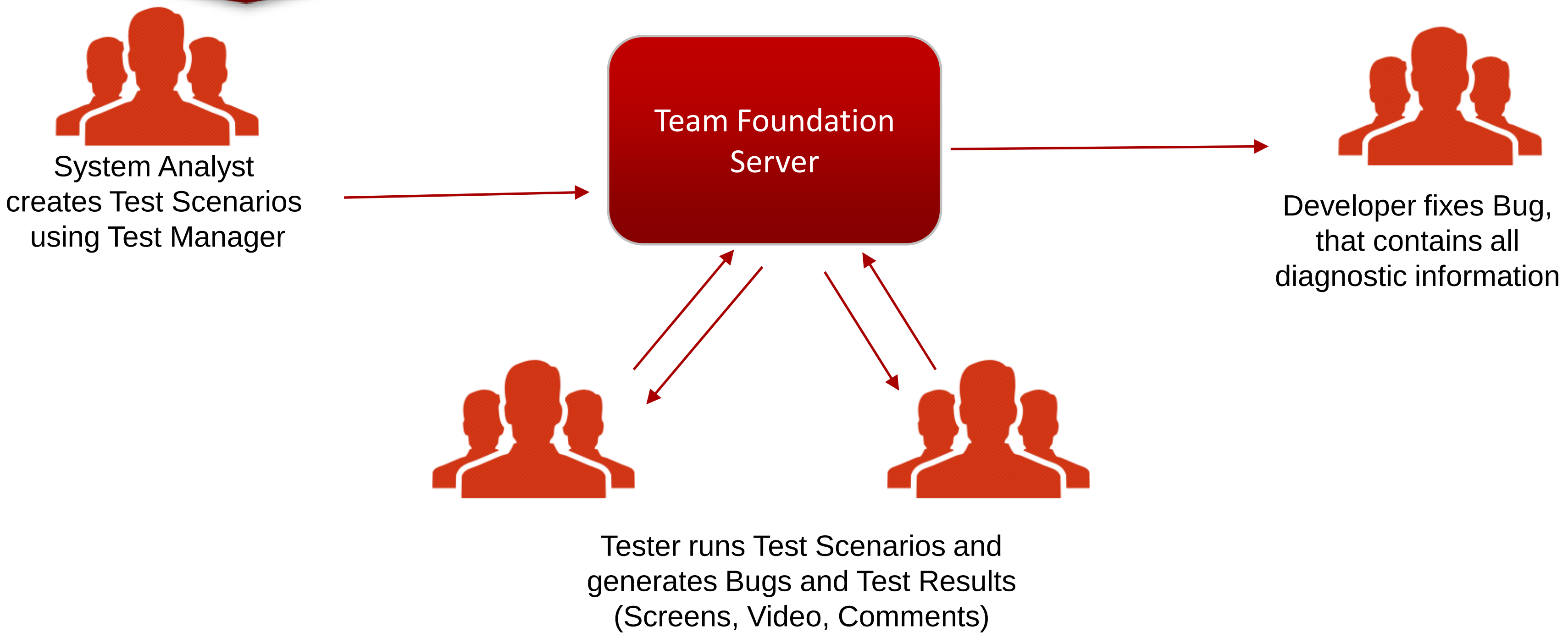
Application Lifecycle Management — Source Control: BDT — Testing Results Video



Test Agent
The Test Agent is still running. To see the Test Agent status, double-click the icon in the system tray.

Application Lifecycle Management— FAS Approach: Manual Testing


System Analyst creates Test Scenarios using Test Manager
Team Foundation Server
Developer fixes Bug, that contains all diagnostic information
Tester runs Test Scenarios and generates Bugs and Test Results (Screens, Video, Comments)

- FAS uses Microsoft Test Manager for creating, managing and running Test Suites and Test Scenarios.
- FAS Testers also work in TFS integrated environment
- FAS developers get detailed information concerning bugs directly in IDE
- Automatic builds are used to update test environment with one click

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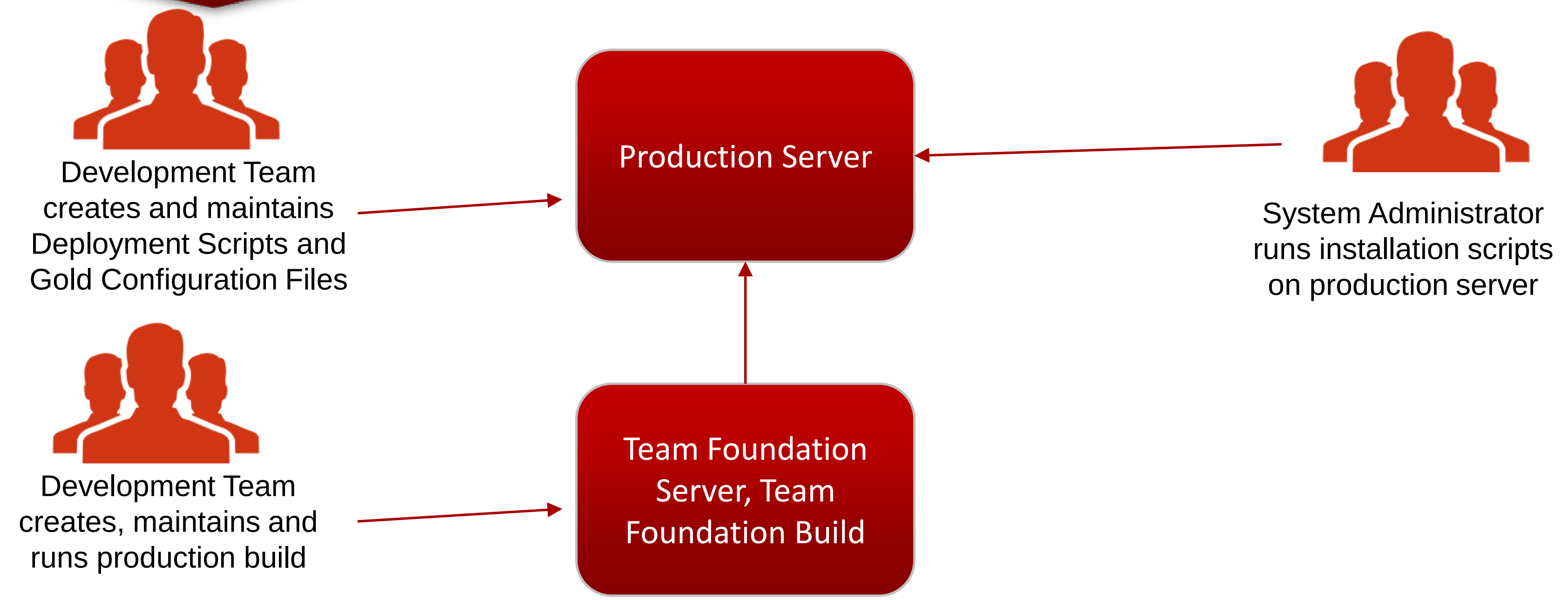
Application Lifecycle Management—FAS Approach: DML, Deployment


Development Team creates and maintains Deployment Scripts and Gold Configuration Files
Production Server
System Administrator runs installation scripts on production server
Development Team creates, maintains and runs production build
Team Foundation Server, Team Foundation Build

- FAS uses Team Foundation Build to maintain Definitive Media Library. Retention plan is approved by management. Every production build is stored in TFS, according to retention plan.
- Production server update is automated interactive procedure, that uses builds stored on TFS Build Server. Stakeholders are notified automatically about updates.
- Configuration and version management is also automated using TFS. All deployment details are logged.

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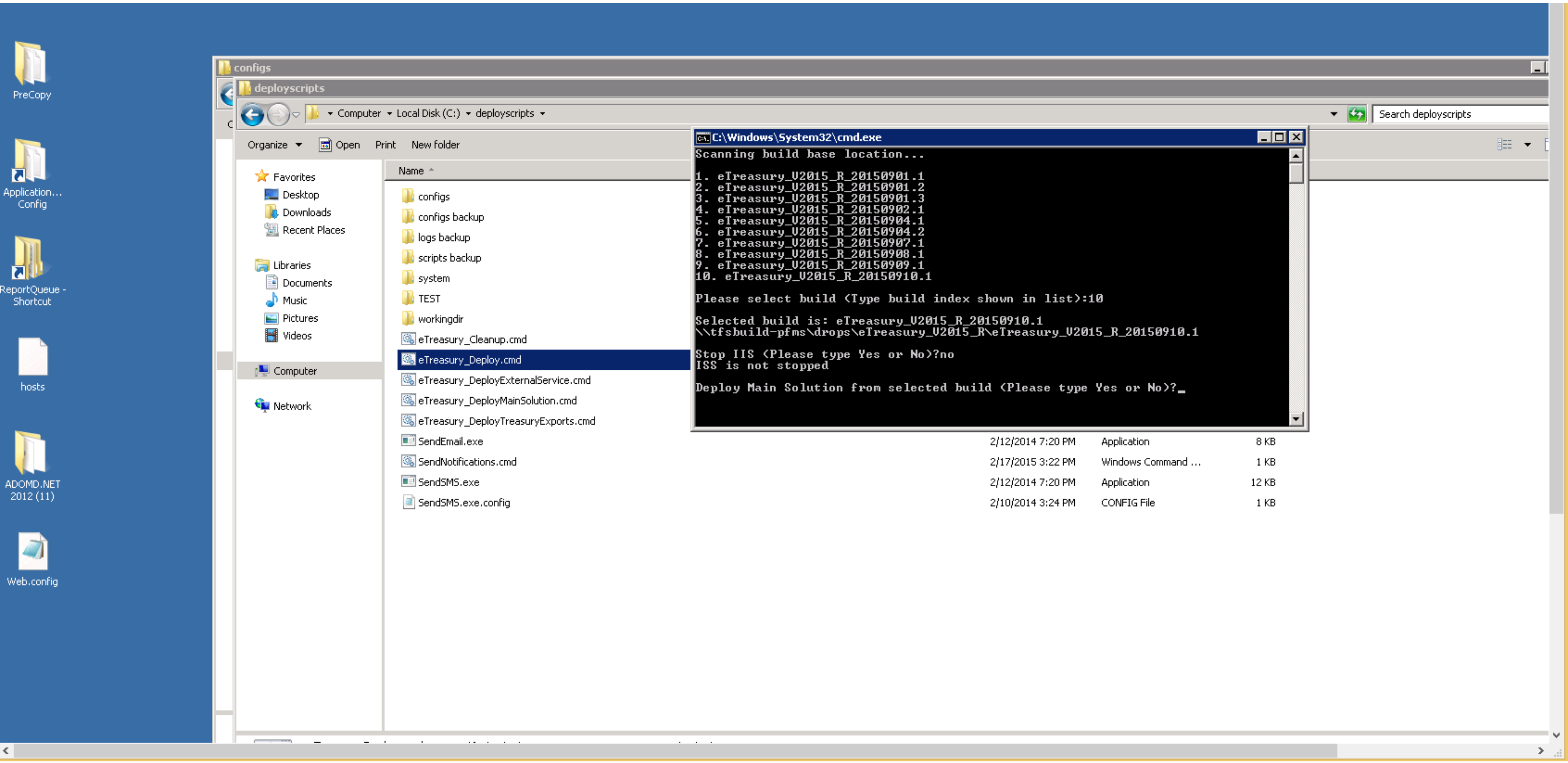
Application Lifecycle Management— FAS Approach: DML, Deployment (2)



Name	Date	Type	Size
configs			
configs backup			
logs backup			
scripts backup			
system			
TEST			
workingdir			
eTreasury_Cleanup.cmd			
eTreasury_Deploy.cmd			
eTreasury_DeployExternalService.cmd			
eTreasury_DeployMainSolution.cmd			
eTreasury_DeployTreasuryExports.cmd			
SendEmail.exe	2/12/2014 7:20 PM	Application	8 KB
SendNotifications.cmd	2/17/2015 3:22 PM	Windows Command ...	1 KB
SendSMS.exe	2/12/2014 7:20 PM	Application	12 KB
SendSMS.exe.config	2/10/2014 3:24 PM	CONFIG File	1 KB

```
Scanning build base location...

1. eTreasury_V2015_R_20150901.1
2. eTreasury_V2015_R_20150901.2
3. eTreasury_V2015_R_20150901.3
4. eTreasury_V2015_R_20150902.1
5. eTreasury_V2015_R_20150904.1
6. eTreasury_V2015_R_20150904.2
7. eTreasury_V2015_R_20150907.1
8. eTreasury_V2015_R_20150908.1
9. eTreasury_V2015_R_20150909.1
10. eTreasury_V2015_R_20150910.1

Please select build (Type build index shown in list):10

Selected build is: eTreasury_V2015_R_20150910.1
\\tfsbuild-pfms\drops\eTreasury_V2015_R\eTreasury_V2015_R_20150910.1

Stop IIS (Please type Yes or No)?no
ISS is not stopped

Deploy Main Solution from selected build (Please type Yes or No)?_
```

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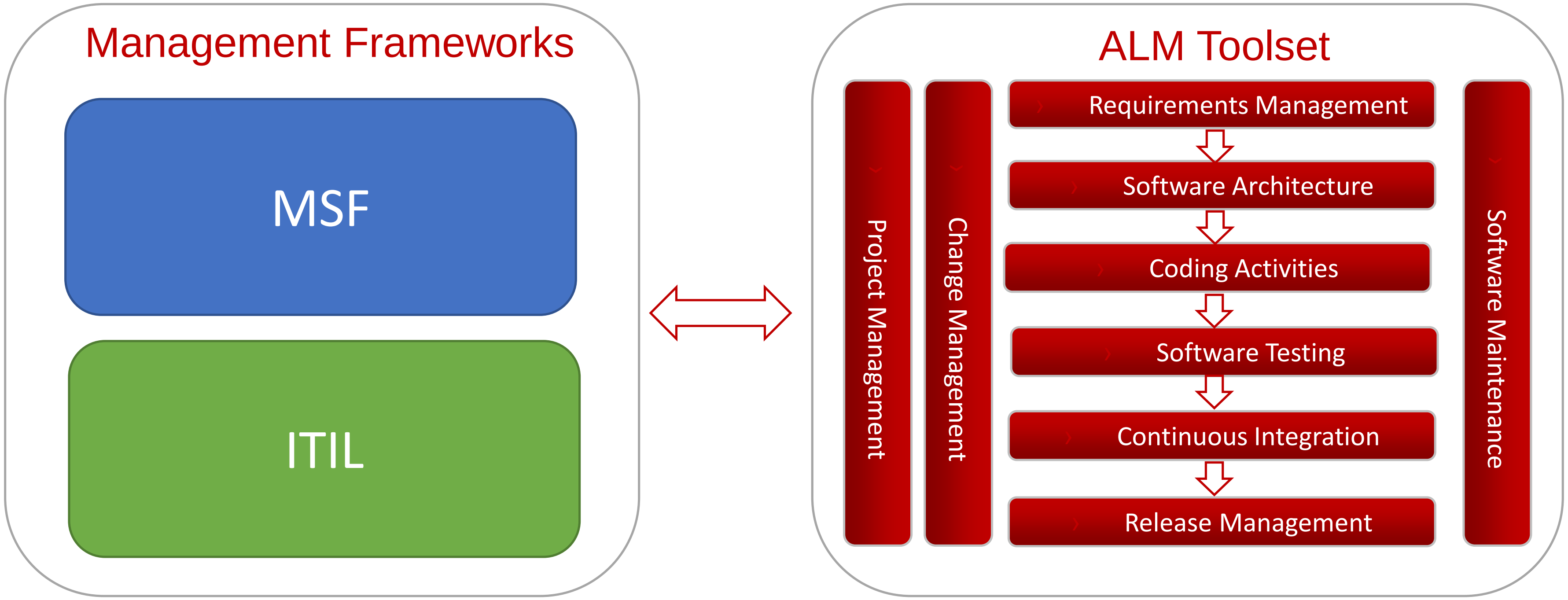
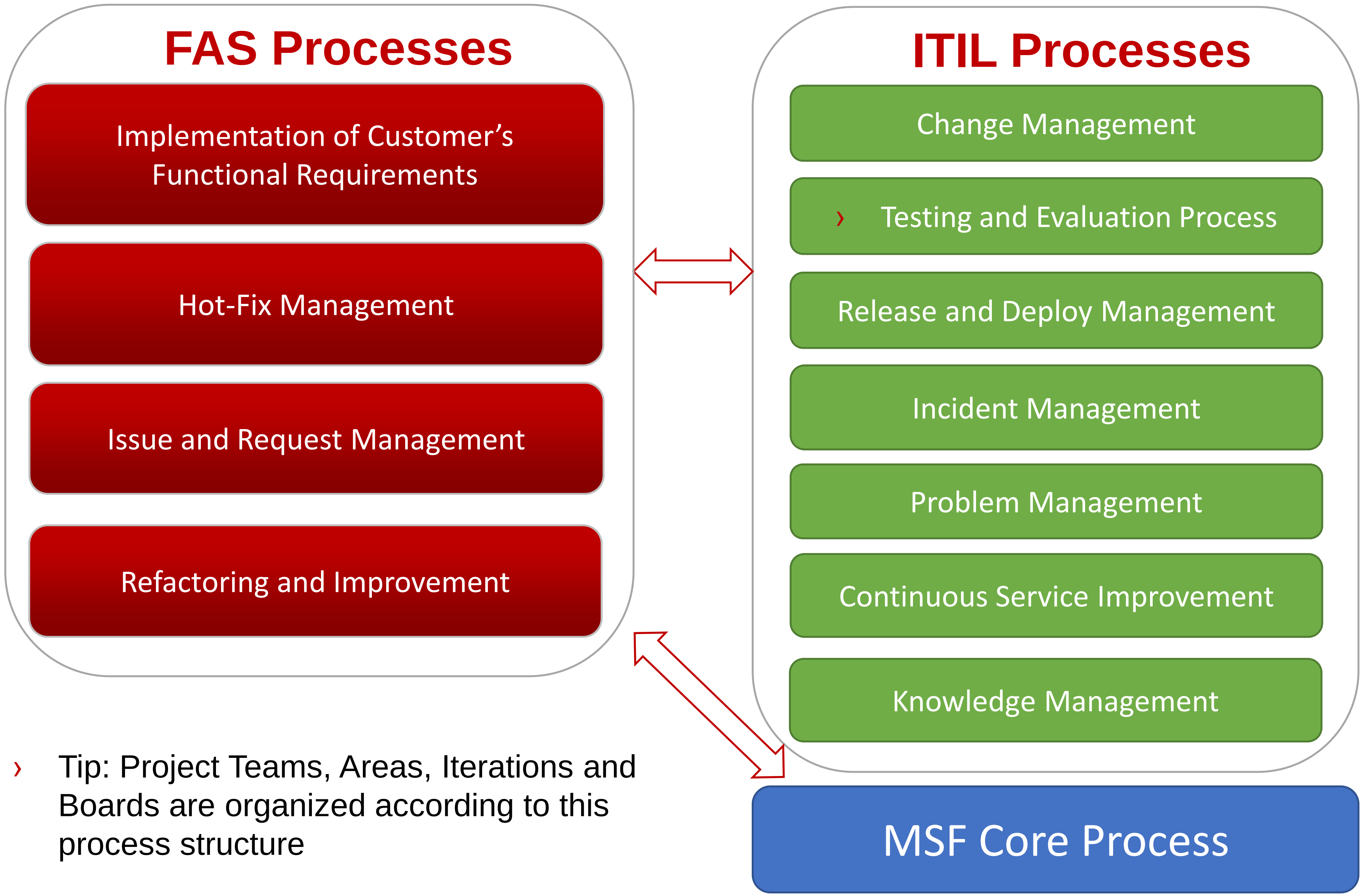
Application Lifecycle Management—FAS Approach: Project Management



- FAS uses Microsoft Solution Framework for Agile Development as a core Software Development Framework. FAS uses ITIL as a core infrastructure and process management framework
- FAS has developed custom strict management process implementation. There is official internal manual, that covers all activities, concerning software development and tools usage
- FAS development processes are technically managed using ALM toolset

Application Lifecycle Management—FAS Approach: Project Management (2)


FAS Processes
Implementation of Customer's Functional Requirements
Hot-Fix Management
Issue and Request Management
Refactoring and Improvement
ITIL Processes
Change Management
Testing and Evaluation Process
Release and Deploy Management
Incident Management
Problem Management
Continuous Service Improvement
Knowledge Management
MSF Core Process

- Tip: Project Teams, Areas, Iterations and Boards are organized according to this process structure

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Thanks for your attention!

Please feel free to ask questions.