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Srdjan Nalis, CA SME Automation Tools

# Continuous Integration Testing

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Jun 2012

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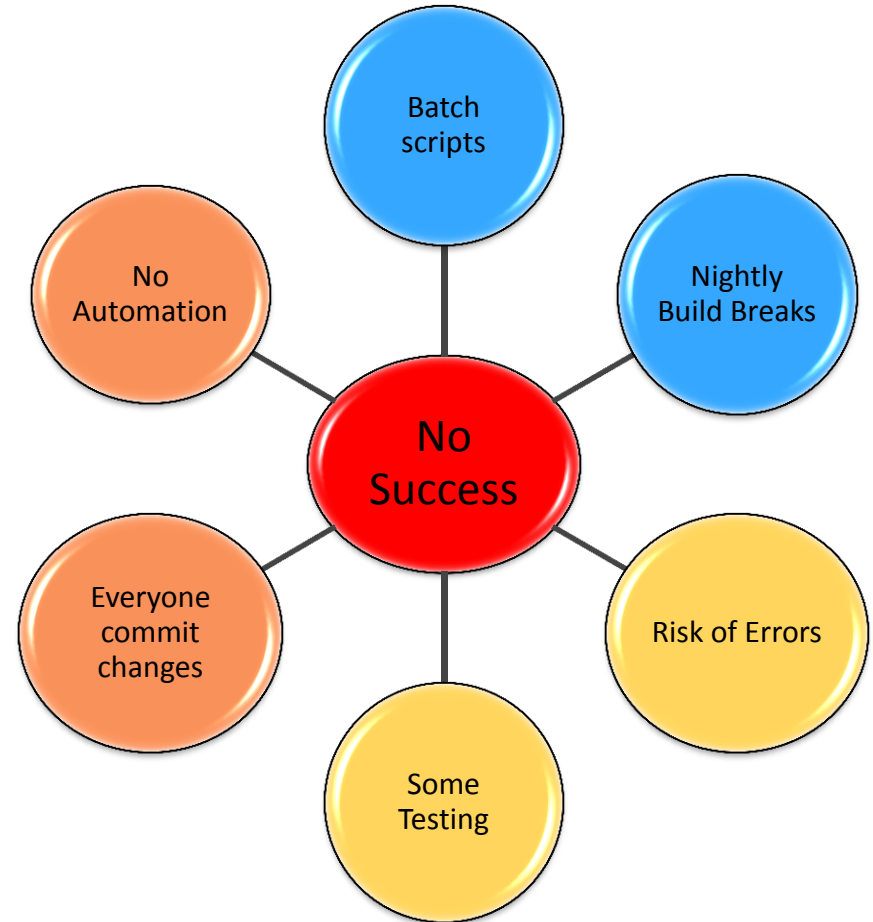


# agenda

- Current Problem - Inefficient Build Process
- Continuous Integration
- Why Continuous Integration?
- Architecture of a Continuous Integration build system
- Team City and HP ALM/QC
- Hudson / Jenkins integration with HP QC/ALM
- Testing in a “Production” environment
- Reporting
- Make a great build
- Future plans
- Q&A

# Current Problem - Inefficient Build Process

- Batch scripts
- No central repository
- Everyone commits changes
- Some testing
- No automation
- Risk of errors
- Nightly builds can break



# Continuous Integration

*“Continuous Integration is a software development practice where members of a team integrate their work frequently, usually each person integrates at least daily - leading to multiple integrations per day. Each integration is verified by an automated build (including test) to detect integration errors as quickly as possible.”*

Martin Flower

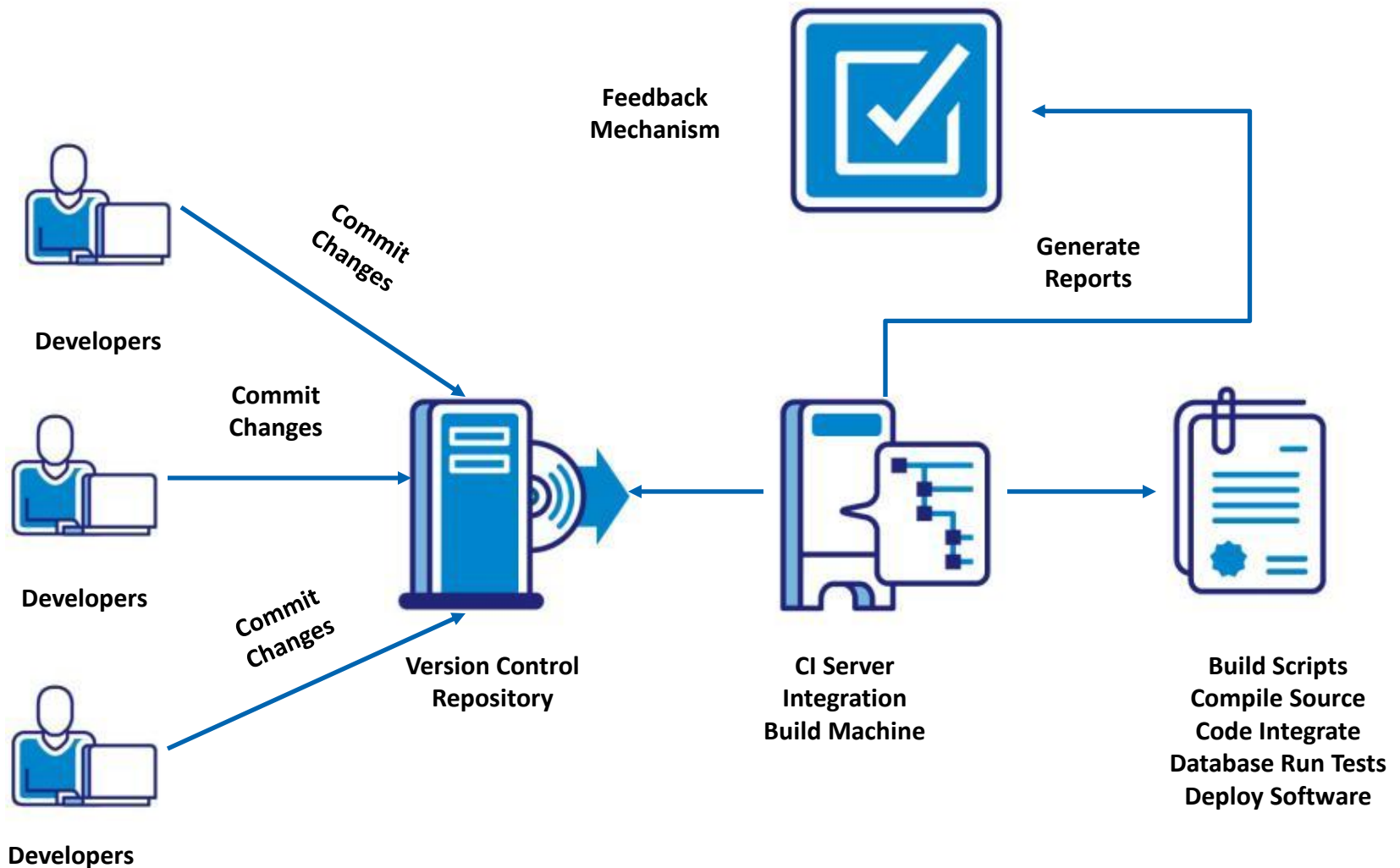
Source : Wikipedia

# why Continuous Integration?

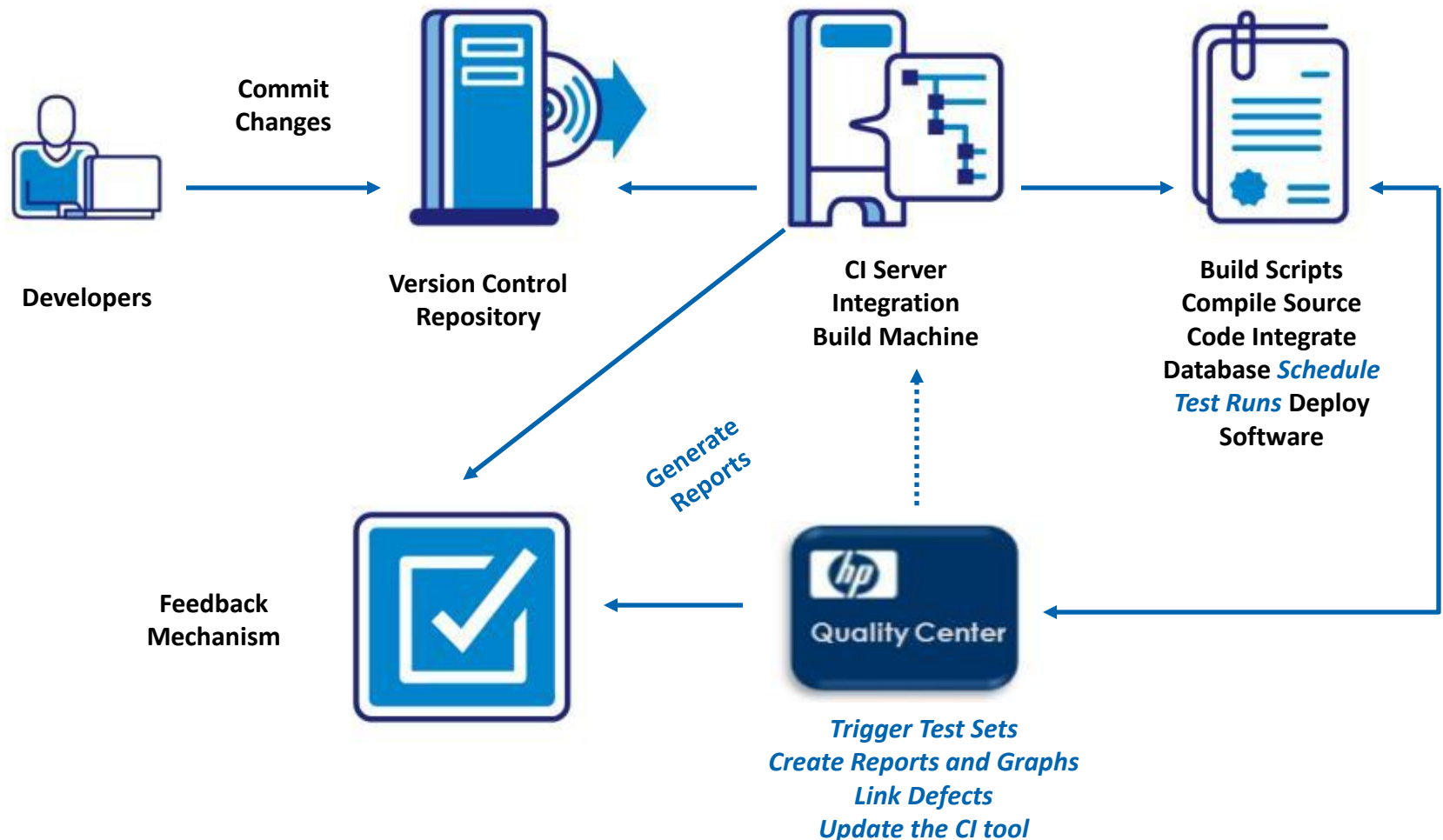
- Avoid broken integrations
- Create successful builds
- Track changes
- Immediate testing of all changes
- Test in the “production” environment
- Detect problems early
- Generate reports and metrics
  - Make progress more visible



# architecture of a Continuous Integration build system



# architecture of a HP QC/ALM and CI test build system





# TeamCity (by JetBrains)



- **Java-based build management and CI system**
- **Supported Environments:**
  - Linux, MacOS , Windows XP, Windows Vista/Windows Vista 64, Windows 7/32x64
  - Windows Server 2008 under Tomcat 7 web application server
  - IBM z/OS
  - HP-UX
- **Source Control:**
  - Subversion, Perforce, VSS, CVS, StarTeam, ClearCase, Team Foundation Server
  - Microsoft Visual SourceSafe, Git, Mercurial and SourceGear.
- **IDE integration**
  - Eclipse 3.3.2-3.7, running under JDK 1.5+
  - IntelliJ Platform plugin: compatible with IntelliJ IDEA 9.x - 11.x (Ultimate and Community editions);
  - JetBrains RubyMine 2.0 - 4.0, JetBrains PyCharm 1.0-2.x, JetBrains PhpStorm/WebStorm 1.0-3.x
  - Microsoft Visual Studio 2005, 2008 and 2010

# TeamCity at CA Technologies

- Standard CI tool
- ALM/HP Quality Center Plug-in

# usage

- This plugin adds a new Builder type to TeamCity for HP Quality Center tests. In order to use it a build step of type "HP Quality Center" will need to be added to your configuration as shown:

The screenshot displays the TeamCity administration interface for configuring a build step. The breadcrumb navigation shows 'Administration > RTC Project > QC Tests Configuration'. The main section is titled 'Build Step (4 of 8): HP Quality Center'. A red arrow points from the 'Build Steps (8)' link in the 'Configuration Steps' sidebar to the 'Runner type' dropdown menu, which is set to 'HP Quality Center'. The configuration fields are organized into sections: 'Connection Settings' (Quality Center URL, Project), 'Security settings' (Quality Center Domain, Login, Password), and 'Test settings' (TestSet Folder, TestSet Name, Timeout, Run Mode, Fail on error). The 'Run Mode' is set to 'Run Locally on agent'. The 'Fail on error' is set to 'true'. The 'Configuration Steps' sidebar on the right lists steps 1 through 7, with '3 Build Steps (8)' highlighted. At the bottom right, there are buttons for 'Pause', 'Copy', 'Move', 'Delete', and 'Extract Template'.

# property definitions

Property	Description
Quality Center URI	The location of the Quality Center server
Project	The name of the Quality Center project
Quality Center Domain	The name of the Quality Center domain
Quality Center Login	The name of the Quality Center login
Quality Center Password	The name of the Quality Center password
TestSet Folder	Quality Center testset folder
TestSet Name	Quality Center testset name
Timeout	Number of seconds before timeout
Run Mode	Run Locally on agent: Will execute tests on the build agent Run on planned host: Will execute tests on the host configured in QC Remote run: Run tests on the specified host
Run Host	The host to attempt to run tests on when using Remote Run
Fail on error	true: any test failures will cause the build configuration to fail. false: will allow the build to continue even with test failures

# Hudson

- **Java based CI tool developed by Sun Microsystems (Oracle)**
- **Open Source CI Server**
- **Unix/Linux Installation support:**
  - Ubuntu, Debian, Oracle Linux, Red Hat Enterprise Linux, CentOS, Fedora,
  - Unix daemon, OpenSolaris, Gentoo, FreeBSD, Solaris 10 service, Unix daemon
- **Source Code integrations:**
  - Subversion, CVS, ClearCase, Perforce, Mercurial, Harvest, Maven and more
- **Extensibility**
  - 250 + plug – ins available
  - Huge community of users
- **Tools integration:**
  - Junit, QuickTest Pro, Quality Center, ALM, TestNG and more
- **Easy to install and use:**
  - Java. Jar file execution via hudson.war
  - Eclipse Foundation
  - OS specific package
  - Browser configuration



- **Java based application that monitors executions of repeated jobs**

- Building/testing software projects continuously
- Monitoring executions of externally-run jobs

- **Open Source CI Server**

- **Tools integration:**

- Junit, QuickTest Pro, Quality Center, ALM, TestNG and more

- **Extensibility**

- 250 + plug – ins available
- Huge community of users

- **Builds:**

- Ant, Maven, shell script, NAnt

- **Easy installation:**

- Via standard Setup.exe or java -jar via jenkins.war
- OS specific package (no additional installation)
- No database
- Browser configuration



# Hudson / Jenkins integration with HP QC/ALM and QTP

- Plug-in's allow triggering HP Quality Center test sets as a build step that can then be presented as a result in Hudson's / Jenkins UI
- HP tools support :
  - HP Quality Center 10 and ALM 11 (installation of QC client side and triggering of Test Sets)
  - HP Quick Test professional 9.0, 9.1, 9.2 (installation of QTP Add-in/ test execution)
  - Retrieving of Test Set execution results
  - Other future versions may work since of HP Quality Center's API is fairly stable across versions
- Versions:
  - 1.0, 1.1, 1.2, 1.2.1 and the next projected release

# Hudson / Jenkins integration with QC/ALM Test Execution

- HP QuickTest Professional
- HP Service Test
- HP LoadRunner
- HP QC/ALM VAPI-XP tests



# configuring HP QC client and HP QTP add-in installations via Hudson / Jenkins

## Quality Center client

Quality Center client installations

Quality Center client

Name HP Quality Center 10

☒ Install automatically

Quality Center client installer

Quality Center Server URL http://qualitycenter.ca.com/qcbin/

Path to QCClient.msi

Delete Installer

Add Installer ▼

Delete Quality Center client

Add Quality Center client

List of Quality Center client installations on this system

## QuickTest Professional Add-in

QuickTest Professional Add-in installations

QuickTest Professional Add-in

Name QuickTest Pro

☒ Install automatically

QuickTest Professional Add-in for Quality Center

Add-in Version to Install QuickTest Professional Add-in 9.2 ▼

☒ I agree to the QuickTest Professional Add-in License Agreement

Advanced...

Add Installer ▼

Delete Installer

Add QuickTest Professional Add-in


Delete QuickTest Professional Add-in

List of QuickTest Professional Add-in installations on this system

# adding HP QC test sets to your Hudson/Jenkins build

**Build**

---

 **HP Quality Center**

Don't forget to enable the **Publish Quality Center tests results** option in the **Post-build Actions** section so that the tests results are published.

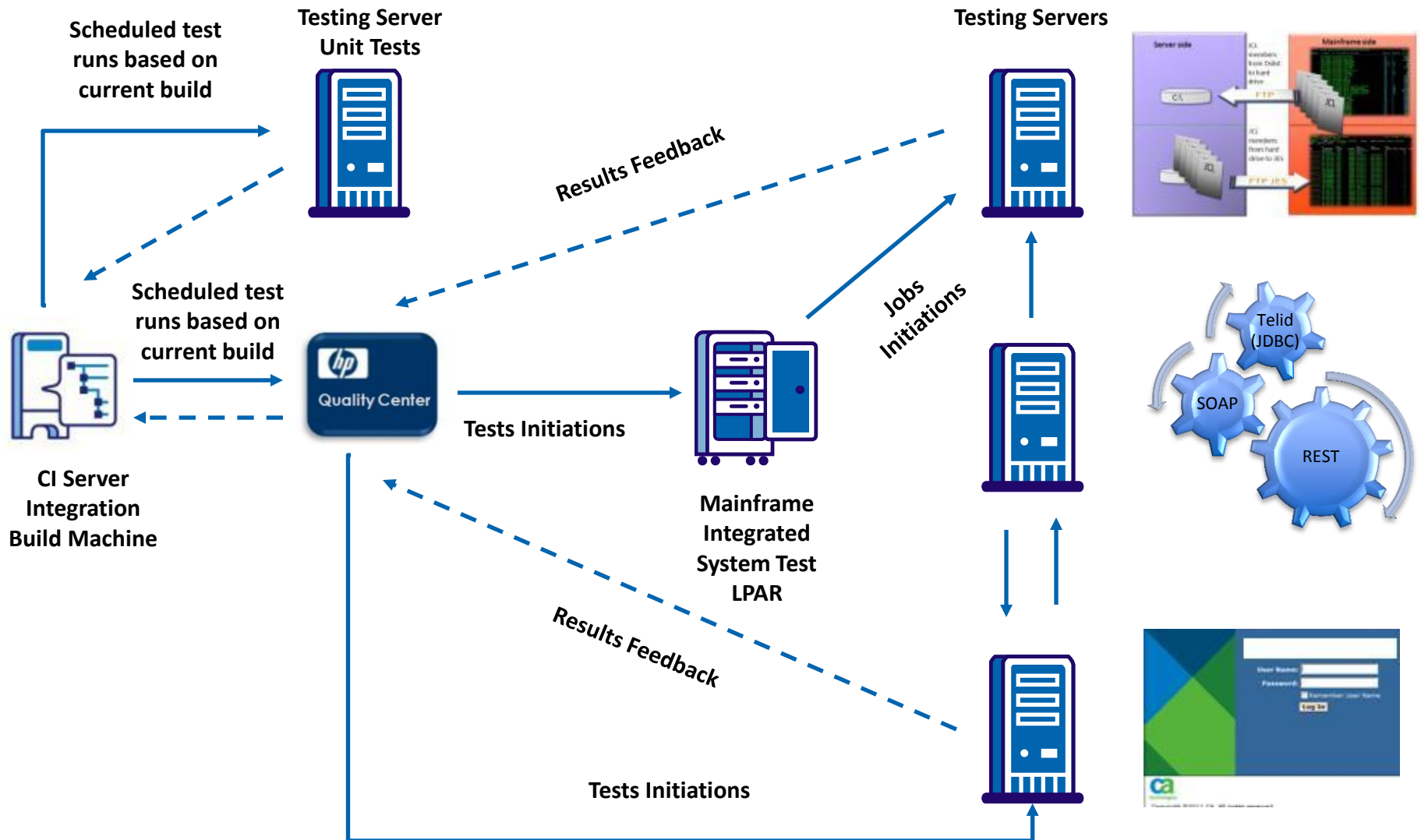
Quality Center Installation	ALM 11
QuickTest Professional Addin Installation	QuickTest Pro
Quality Center Server	http://usilap512-dev:8080/qcbin/
Quality Center Login	NALSR02
Quality Center Password	●●●●●●●●
Quality Center Domain	MAINFRAME
Quality Center Project	CA1
TestSet Folder	Core_Functionality
TestSets Name	TMSSPLIT
Timeout	600

Add build step ▼

# test in a “production” environment

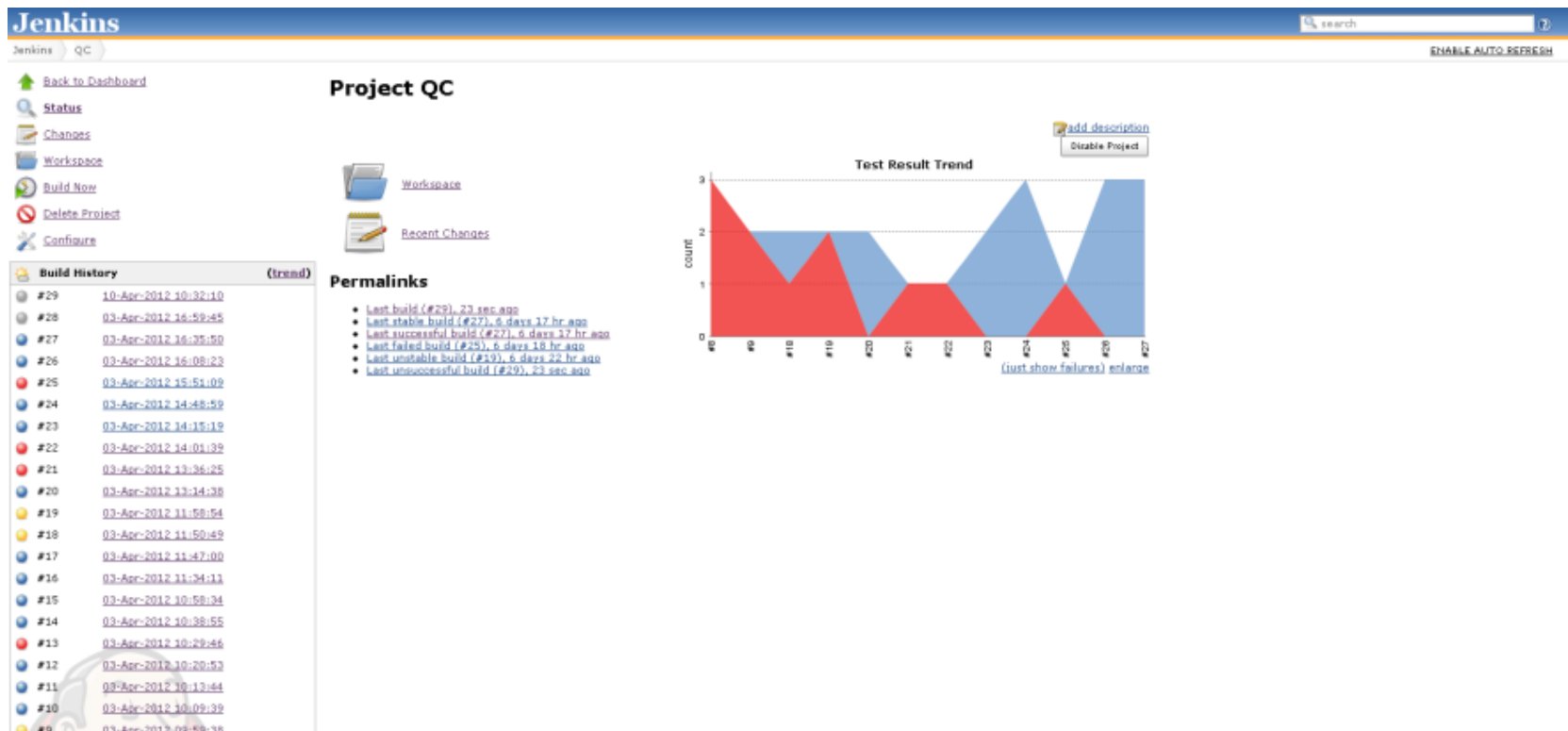
- Clone your production environment (or more importantly, your customer’s production environment!)
- Testing Servers
- Virtualization

# test in a “production” environment



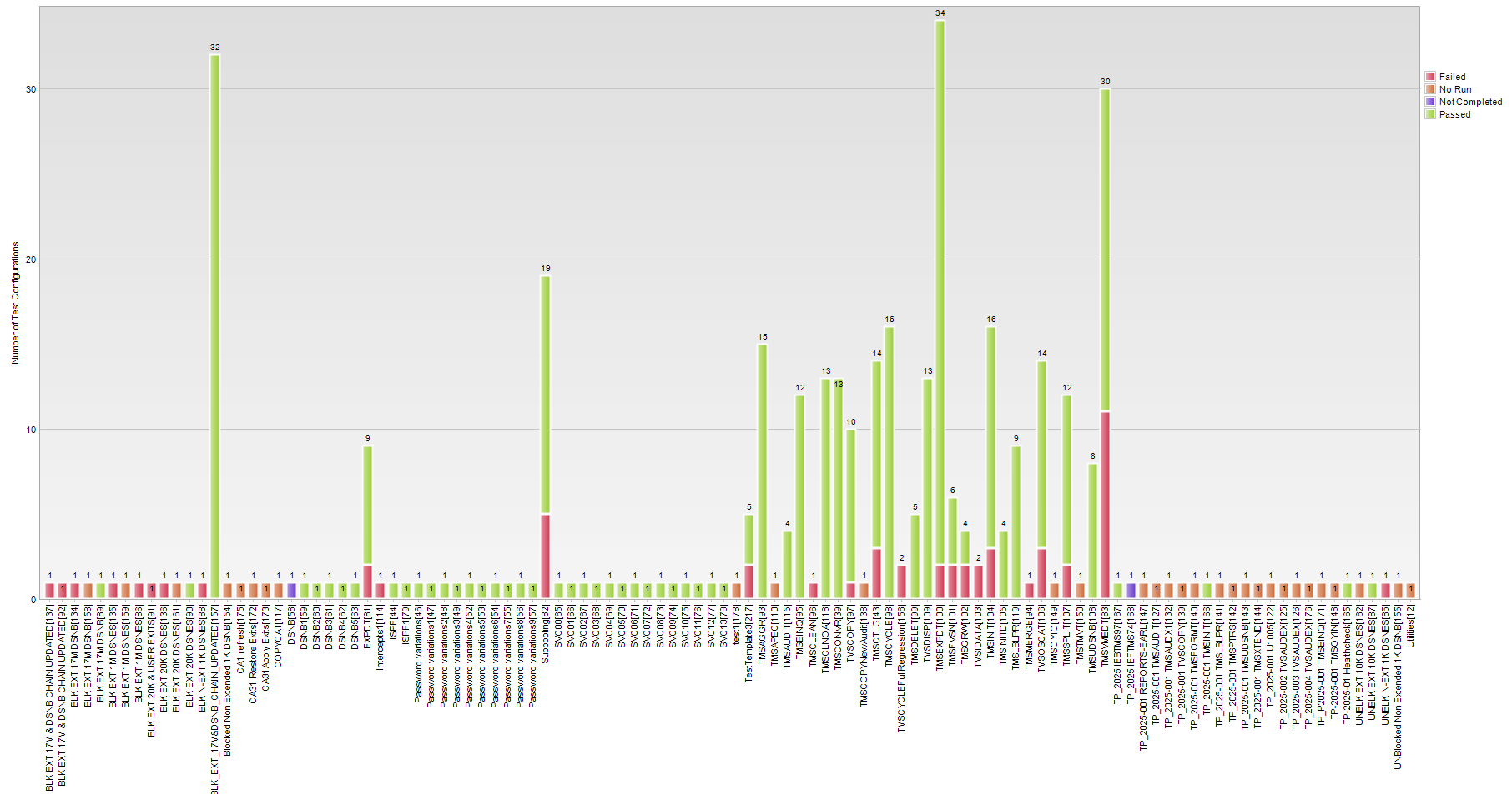
# dashboard reports and graph examples

## CI and HP test automation tools



# dashboard reports and graph examples

## CI and HP test automation tools



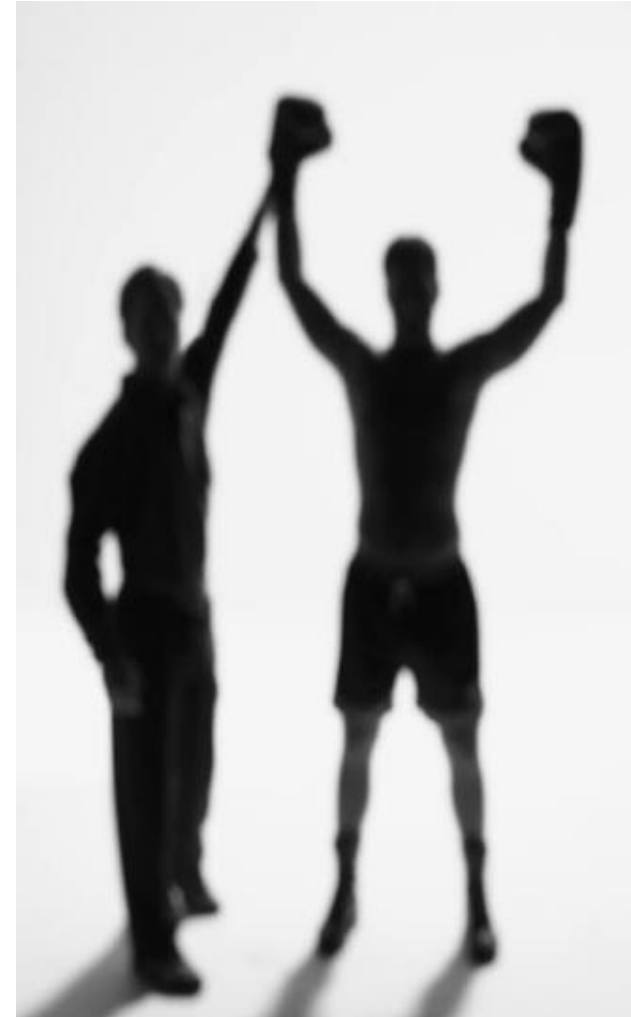
# making a great build

- Create tests
- Automate the “Monkey business”
- Run as a part of build life-cycle
- Hook it all up into a CI server
- Integrate with a test management tool



# The Final Outcome !

- ✓ The "X project" mix of mainframe – mid layer – GWT front end
- ✓ 29 sub projects
- ✓ Nightly Build passed with **50 %** pass rate
- ✓ Successful implementation of Continuous Integration with HP tools automation during Nightly Builds
- ✓ Savings in by using HP QC/CI test / build automation:
  - ✓ **Up to 70% time reduction in test execution**
  - ✓ **90% in project traceability**
  - ✓ **99 % tests reusability**
- ✓ Nightly Build passed with **84 %** pass rate





# future plans

- Client Installation for ALM 11
- Add-in for QTP 10 and greater
- REST interface between ALM and CI tool
- ALM – CI – Mainframe
- Defects
- Trend reports

Questions ?

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