CONTINUOUS INTEGRATION, DELIVERY & DEPLOYMENT

ONE CLICK DELIVERY

QUICK POLL

SAFE?

Are you using version control?

QUICK?

Can you release new version of your software in one day?

QUICK AND SAFE?

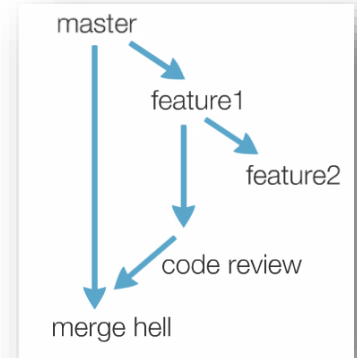Can you release new, **well-tested** version of your software in one day?

DEVELOPMENT NOW

DEVELOPMENT NOW

- Each developer has feature branches
  - *If* the version control is used at all
- Features are deployed when completed
- Integration issues

- Small test suite

PROBLEMS

- Bringing software into production is hard

- Takes a lot of time

- Error prone

SOLUTION – CONTINUOUS INTEGRATION

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 Fowler

CHANGE THE WORKFLOW!

- Checkout/update

- Code

- Build & test locally

- Update (merge)
  - Retest if changed

- Commit

- Continuous Integration server takes over …

CHANGE THE VERSIONING!

- No 'feature' branches

- Temporary 'developer' branches
  - Good to test crazy ideas
  - Branch and throw away

- **Trunk must always compile**

- Avoid big scary merges

master

↓

feature1 r1

↓

feature2 r1

↓

feature1 r2
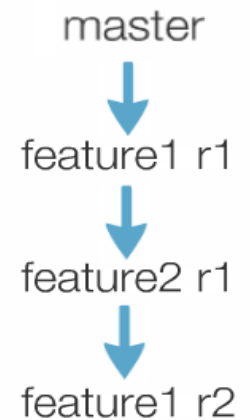
HOW TO HANDLE FEATURES

- No 'feature' branches

- Features can be toggled on and off via deployment or compilation configuration

  - Also helps with Continuous Delivery/Deployment

- Keep features small

- Improve features interactively

  - Introduce early, then improve

SIDENOTE – VERSION CONTROL SYSTEMS

- History
  - Log
  - Blame
- Revert to version
  - Bug-finding tool
- Branches
  - Tag/mark every release

- Always use VCS – even for single-person projects!

Filter by Messages, Paths, Authors, Revisions, Bug-IDs, Date, Date Range

From: 18. 9.2014 | To:

Revision	Actions	Author	Date	Message
14698		istvan	30. september 2014 1:02:48	+ added a simple (incomplete) REST API wrapper in restapi.js * Login vm changed to a class
14695		istvan	29. september 2014 18:00...	+ added support for AuthorizeAttribute to controllers and their invokable methods. a class should implement a method wit
14694		primoz	29. september 2014 16:44...	+ added 'Use custom background color' checkbox
14693		primoz	29. september 2014 13:58...	! Page caption is updated when user interface language is changed.
14691		primoz	29. september 2014 13:01...	* code cleanup & doc
14690		primoz	29. september 2014 13:01...	! fixed command line selection problems with Ettwin
14689		primoz	29. september 2014 11:38...	+ Background color can be set in Options, Editor.
14688		primoz	29. september 2014 10:51...	! Fixed problems with caret wrapping in Block mode.
14686		istvan	28. september 2014 23:29...	+ added font-awesome icons * prompt to discard changes if a page's text is changed and trying to navigate to another it
14685		istvan	27. september 2014 22:07...	* TWorkstationInfoController Log returns only newer items than specified
14684		istvan	27. september 2014 21:56...	* cleaned up web interface code
14683		istvan	26. september 2014 17:46...	* updated Subtitler WEB interface
14682		istvan	26. september 2014 17:39...	* updated NC web interface to use the new translator.js
14680		primoz	26. september 2014 15:32...	+ different color display (number on background) + color background is transparent in Open mode
14679		istvan	26. september 2014 13:32...	* Subtitler automation.js stores all strings in "labels" object for dynamic translations
14678		primoz	26. september 2014 12:47...	+ editor colors on Home ribbon tab are correctly displayed
14676		primoz	26. september 2014 10:54...	+ MUCH cleaner code
14675		istvan	25. september 2014 22:43...	* translator.js service can translate an object and update its properties * Subtitler automation web interface has all trans
14674		primoz	25. september 2014 22:38...	+ bitmaps are displayed (stretched) + cleaner code
14673		primoz	25. september 2014 17:07...	+ colors in Edit group are custom painted [currently colors are selected randomly]
14672		build	25. september 2014 16:48...	FT-OFFICE 3.89
14671		miha	25. september 2014 16:35...	* password form is opened if logon does not work * office version 3.89
14670		istvan	25. september 2014 16:19...	NC WEB interface displays app version in the footer and the computer name Subtitler WEB interface displays the log in St
14667		primoz	25. september 2014 12:06...	* oldconfig.ttxconfig -> previousconfig.ttxconfig
14666		primoz	25. september 2014 11:17...	+ When configuration is restored to default, previous configuration is stored to oldconfig.ttxconfig, not ettwin.ttxconfig.
14665		primoz	25. september 2014 10:59...	* controllers are rebased on TRestPublicController
14662		miha	24. september 2014 17:54...	* To install the same version hold Shift or Ctrl on clicking on OK (InstallerForm.pas) * Search filter in export corrected * Su
14661		istvan	24. september 2014 16:49...	updated readme.txt
14660		istvan	24. september 2014 16:48...	* updated manual to include REST '/info/log' API
14659		istvan	24. september 2014 16:08...	* log status in rest returns the same string as the file log (OK, ER, ST, WA)
14658		istvan	24. september 2014 15:43...	+ added get log api to subtitler REST server; call http://{server}/info/log to get the full log, or pass in parameters to spec
14657		primoz	24. september 2014 11:53...	+ initialize ModalPopupMode

Revision	Author	Line	
10091	primoz	482	`begin`
10091	primoz	483	`  if TryStrToInt64(value, intValue) then`
10091	primoz	484	`    Result := intValue`
10106	primoz	485	`  else if TryStringToGuid(value, guidValue) then`
10106	primoz	486	`    Result := TOmniValue.FromRecord<TGUID>(guidValue)`
10091	primoz	487	`  else`
10091	primoz	488	`    Result := value;`
10091	primoz	489	`end; { RestTypeMapper.MapStringToValue }`
10091	primoz	490	
10104	primoz	491	`class function RestTypeMapper.MapValueToArgument(const paramType: TTypeKind;`
10106	primoz	492	`  const value: TRestParameter): TValue;`
10091	primoz	493	`begin`
10104	primoz	494	`  if paramType in [tkString, tkUString, tkWString, tkLString, tkChar, tkWChar] then`
10106	primoz	495	`    Result := value.StrValue`
10106	primoz	496	`  else if paramType = tkRecord then`
		497	`    Result := TValue.From<TGUID>(value.Value.ToRecord<TGUID>)`
			`  else`
			`    Result := value.Value.AsTValue;`
10091	primoz	500	`end; { RestTypeMapper.MapValueToArgument }`
10091	primoz	501	
10114	primoz	502	`class function RestTypeMapper.TryStringToGuid(const value: string; var guidValue: TGUID):`
10114	primoz	503	`var`
10114	primoz	504	`  invalid: boolean;`
10114	primoz	505	
10114	primoz	506	`  function HexChar(c: char): byte;`
10106	primoz	507	`  begin`
10114	primoz	508	`    case c of`
10114	primoz	509	`      '0'..'9':  Result :=  byte(c) - byte('0');`
10114	primoz	510	`      'a'..'f':  Result := (byte(c) - byte('a')) + 10;`
10114	primoz	511	`      'A'..'F':  Result := (byte(c) - byte('A')) + 10;`
10106	primoz	512	`    else`
10114	primoz	513	`      invalid := true;`
10114	primoz	514	`      Result := 0;`
10114	primoz	515	`    end;`
10114	primoz	516	`  end;`
10114	primoz	517	

6.4.2013 13:38:47
+ GUID parameters are supported.

TESTING

- Automate everything
  - If it hurts, do it more often. Continuously.
  - Fail fast.
- Integration testing
- Unit testing
- Functional testing
- Application testing
- Mobile testing

- Whatever you don't test against, **will** happen

REQUIREMENTS

REQUIREMENTS

- Source code repository (version control)
  - Subversion, Git, Mercurial, …
- Project build
  - MSBuild
  - FinalBuilder
  - …
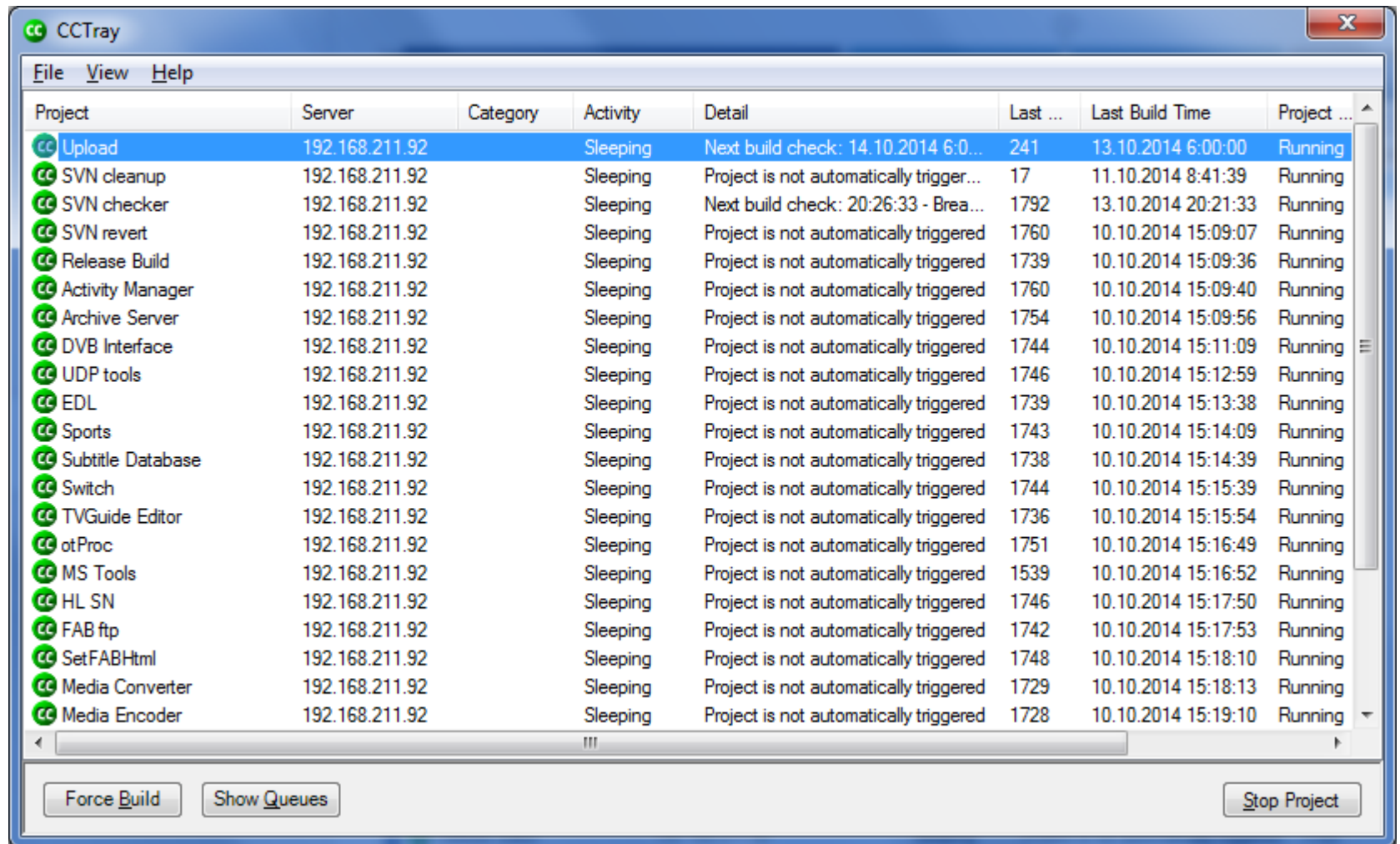- Testing
  - TestComplete
- Continuous Integration server

CI SERVER IN ESSENCE

```
while true do
begin
    if change_checked_into_vcs then
    begin
        if not build then

            report_error;

        if not test then

            report_error;
    end;

    sleep;
end;
```

CI SERVERS

- Continua CI
  - VSoft (FinalBuilder)
- Jenkins
  - Hudson fork
  - Java
  - Commercial support - Cloudbees
- CruiseControl.Net
  - XML configuration :(

PROJECT MONITORING

CI RECOMMENDATION

- Use a separate server (or VM)
  - For CI, or
  - For CI + build, or
  - For CI + build + test

CENTRAL DOGMA

- Build early, build often
  - On every checkin
  - Check in early, check in often

BENEFITS

BENEFITS

- Brings order into chaos

- Everything could be achieved without the Continuous Integration, but …

- CI is the great enforcer

BENEFITS

- Code is always in the consistent state

- Code always compiles

- Automatic tests

- Automatic feedback on product readiness

CODE ALWAYS COMPILES

CODE ALWAYS COMPILES

- Code should **always** build and test.
  - → Continuous Delivery

CONTINUOUS DELIVERY

CONTINUOUS DELIVERY?

"The essence of my philosophy to software delivery is to build software so that it is **always** in a **state** where it could be put into **production**. We call this *Continuous Delivery* because we are continuously running a *deployment pipeline* that tests if this software is in a state to be delivered."

– Jez Humble, Thoughtworks

CI <> CD

- CD = CI + fully automated test suite

- Not every change is a release

  - Manual trigger

  - Trigger on a key file (version)

  - Tag releases!

- CD – It is all about testing!

CONSIDER THIS

"How long would it take your organization to deploy a change that involves just one single line of code?"

- Mary and Tom Poppendieck,
Implementing Lean Software Development

CONT. DELIVERY VS. DEPLOYMENT

Continuous Delivery

| build | → | unit tests | → | integration tests | → | validation tests | **MANUAL** → | deploy to production |

Continuous Deployment

| build | → | unit tests | → | integration tests | → | validation tests | **AUTO** → | deploy to production |

CONTINUOUS DEPLOYMENT

CONTINUOUS DEPLOYMENT

A WORD OF WARNING

- Continuous integration is simple.
- Continuous delivery is doable.
- Continuous deployment is a hard problem.

DEPLOYMENT SCHEDULE

- Release when a feature is complete
- Release every day

DEPLOYMENT STRATEGIES

- **Zero-downtime deployment (and rollback)**

- Blue-green
  - Two environments
  - Install on one. Switch. Switch back on problems.
- Canary release
  - Deploy to subset of servers

- Real-time application state monitor!

PROBLEMS

- Technical
  - Databases
    - Schema migration
    - Revert!
    - Change management software
  - Configuration
- Human
  - Even more important
  - Automatic deployment = great fear
  - Customers don't want software to constantly change

TRANSITION

HOW TO INTRODUCE

- (Introduce VCS)
- Gain expertise
  - First step accomplished – you are here
- Automate the build
- Introduce tests
- Prove the concept
  - Introduce CI system
  - Run it in parallel to existing infrastructure
  - Give it time
  - Show the win-win

NOTES FROM THE FIELD

WHAT WE FOUND

- Continuous Integration is relatively easy
    - It is all about communication
- Continuous Delivery is harder (but we are getting there)
    - Some things are hard to test automatically
    - You need dedicated test-writers
- Continuous Deployment is not a requirement
    - Customers don't want it
    - Only for mission critical systems

SIDENOTE - VCS RULES!

- Disks are large, store as much as possible in the VCS

- Continuous Integration server configuration should be stored in the VCS

- You should be able to restore complete build system from the VCS (after installing necessary software)

IMPLEMENTATION

- Run everything in VM
- Backup!

CONTINUOUS INTEGRATION/DELIVERY/DEPLOYMENT

It is all about the people!

SOFTWARE

- Continua CI
  http://www.finalbuilder.com/continua-ci

- Jenkins
  http://jenkins-ci.org

- CruiseControl.NET
  http://www.cruisecontrolnet.org

BOOKS

- Continuous Delivery
  http://www.amazon.com/dp/0321601912

- Continuous Integration
  http://www.amazon.com/dp/0321336380

- Implementing Lean Software Development
  http://www.amazon.com/dp/0321437381

- Release It!
  http://pragprog.com/book/mnee/release-it

REFERENCES

- http://en.wikipedia.org/wiki/Continuous_integration

- http://en.wikipedia.org/wiki/Continuous_delivery

- http://martinfowler.com/articles/continuousIntegration.html

- http://continuousdelivery.com

- http://www.hassmann-software.de/en/continuous-integration-hudson-subversion-delphi/

- http://edn.embarcadero.com/article/40962

- http://thundaxsoftware.blogspot.com/2011/07/continuous-integration-for-your-delphi.html

- http://nickhodges.com/post/Getting-Hudson-set-up-to-compile-Delphi-Projects.aspx

- https://www.finalbuilder.com/resources/blogs/postid/695/building-delphi-projects-with-continua-ci

- http://smartbear.com/products/qa-tools/automated-testing-tools/

QUESTIONS?