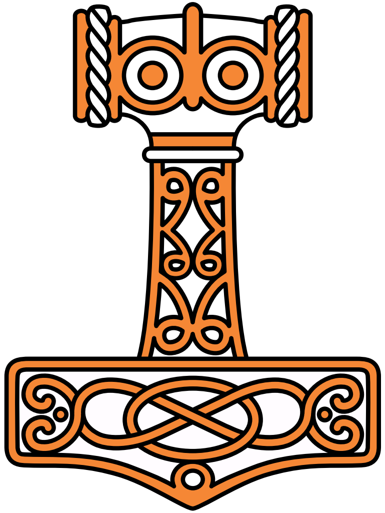
DYALOG

Olhão 2022

Test your Code!

Michael Baas



Info

- everything I will be showing runs on 18.2
- though the DTest changes are too substantial to patch the current 18.2 – so it will be released with v19.
- But DTest as well a CITA are also available on http://github.com/Dyalog
- Questions at the end

DTest => DBuildTest

Agenda

- Motivation
- What to test
- Testing & dog show…

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- Testing & dog show...

Motivation

- Research
    - "Errare Humanum est"
      Seneca, 62
    - "Anything that can go wrong will go wrong [at the worst possible moment]."
      Murphy's Law or "Finagle's Law of Dynamic Negatives", 1970s; also: Sod's Law
    - "Shit happens"
      Forrest Gump, 1994
    - "We all know our code doesn't fail."
      Brian Becker, 2022
- and experience
- make it obvious that software needs to be tested before leaving the house!

What to do

- Unit testing: verify the functionality of a specific section of code (typically: a function)
  - can / should include coverage analysis
  - using a more relaxed interpretation of "unit"
- Integration testing
- UI testing
  - □W-Interfaces
  - Browsers / HtmlRenderer: Selenium

for in-depth info:
ask Aaron!

How to do? …Unit testing

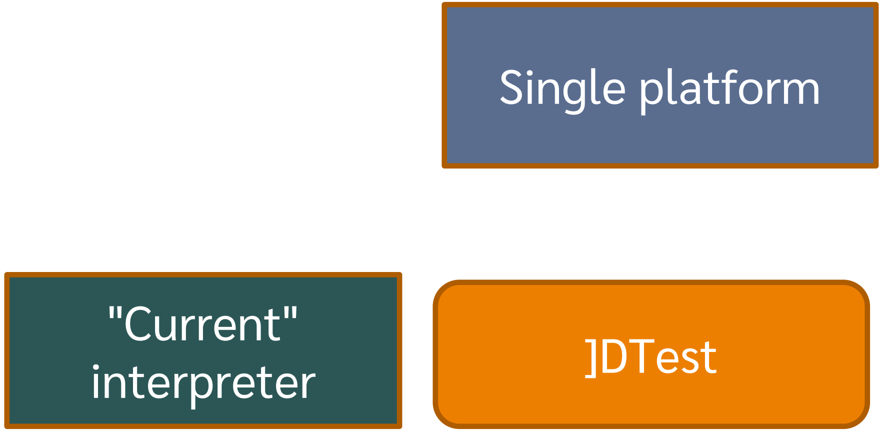
```
R←foo X
⍝ useless code …
:If ~2|X
    R←X+1
:ElseIf X>10
    R←10|X
:Else
    :Select X
    :Case 2
        ∘∘∘
    :Case 3
        R←'Wow..',⍕X
    :Else
        R←0
    :EndSelect
:EndIf
```

Go Pro

- reproduceable
- automate testing
- execute against variety of inputs
- ensure that all paths are taken
  - Code Coverage
- check results

-]demo

Multidimensional testing

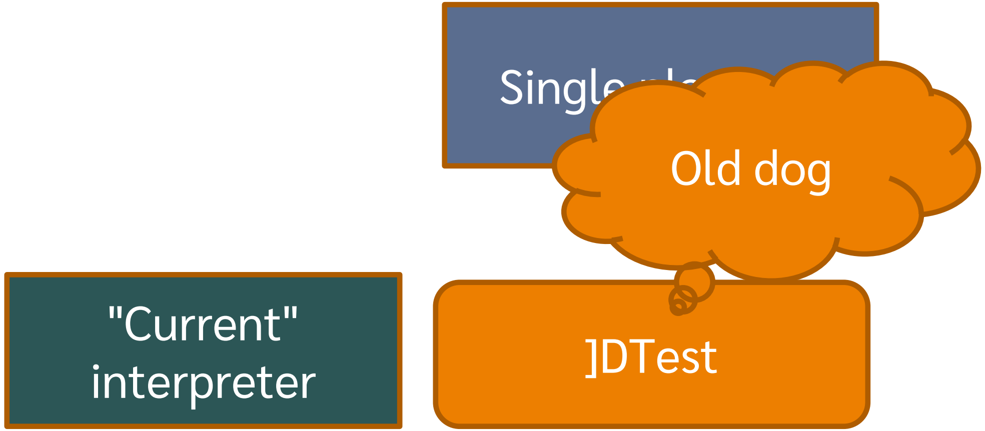


Single platform

"Current" interpreter

]DTest

Multidimensional testing



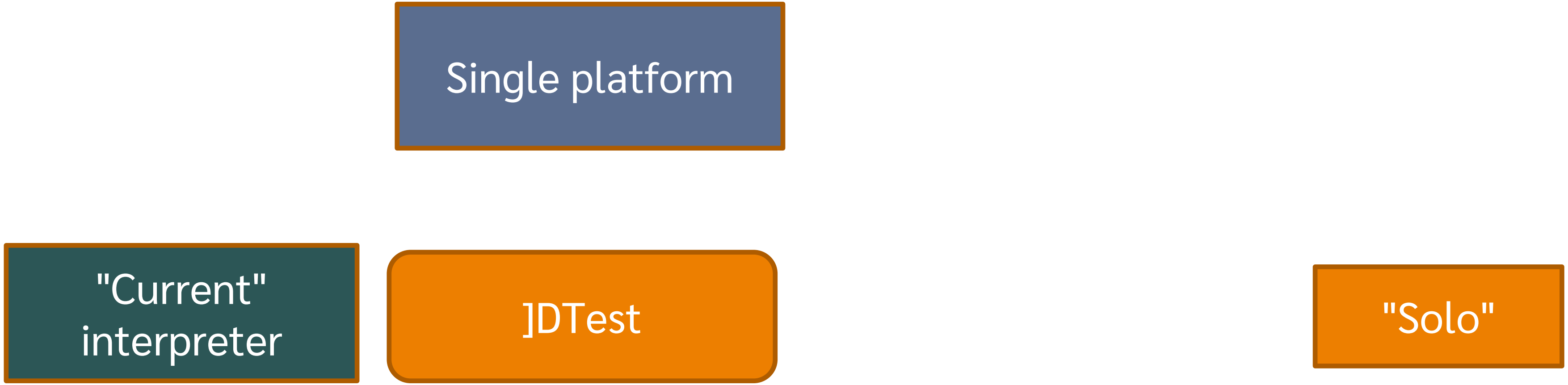
Single pl

Old dog

"Current" interpreter

]DTest

Multidimensional testing



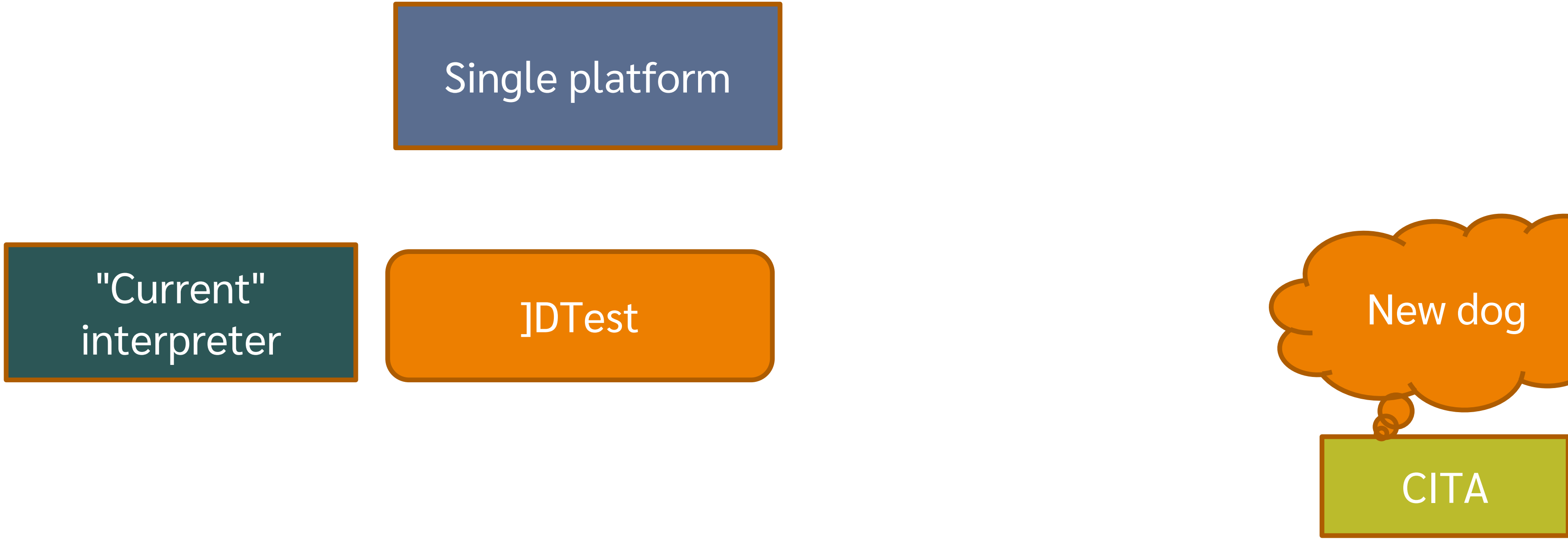
Single platform

"Current" interpreter

]DTest

"Solo"

Multidimensional testing



Single platform

"Current" interpreter

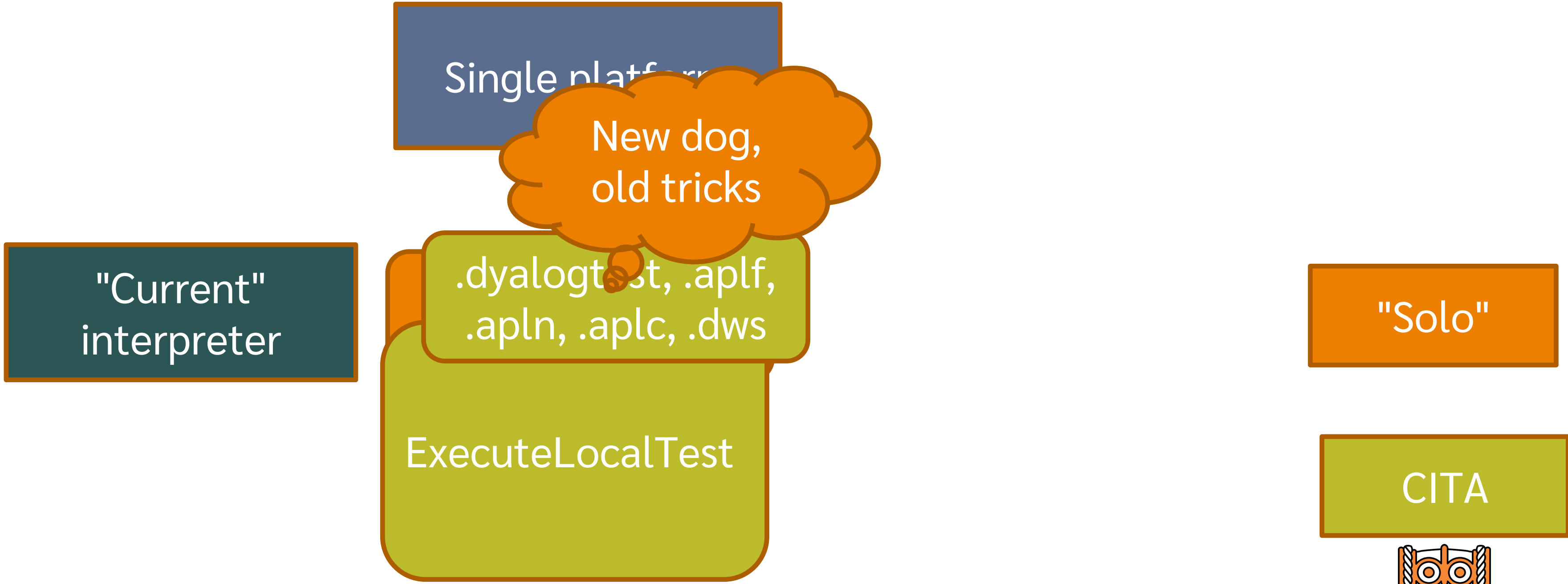
]DTest

New dog

CITA

CITA=Continous Integration & Testing in APL

Multidimensional testing



Single platf

New dog,
old tricks

"Current"
interpreter

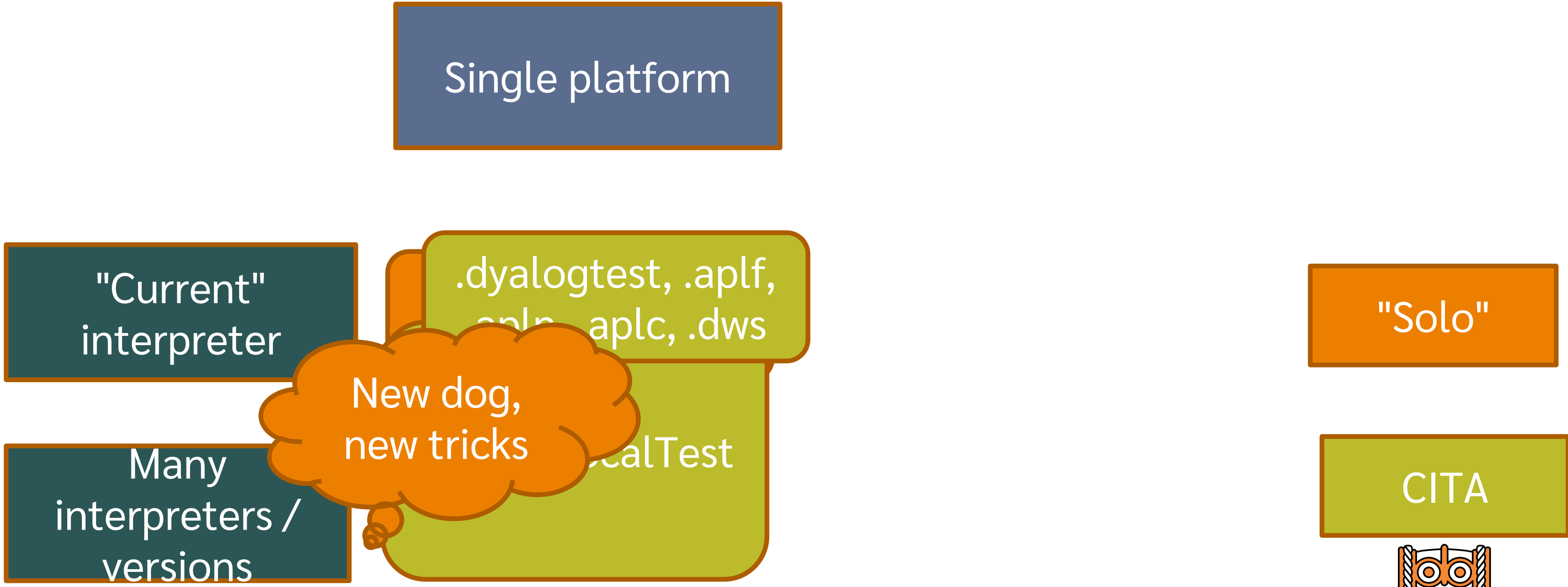
.dyalogtest, .aplf,
.apln, .aplc, .dws

ExecuteLocalTest

"Solo"

CITA

Multidimensional testing



Single platform

"Current" interpreter

Many interpreters / versions

.dyalogtest, .aplf, .apln, .aplc, .dws

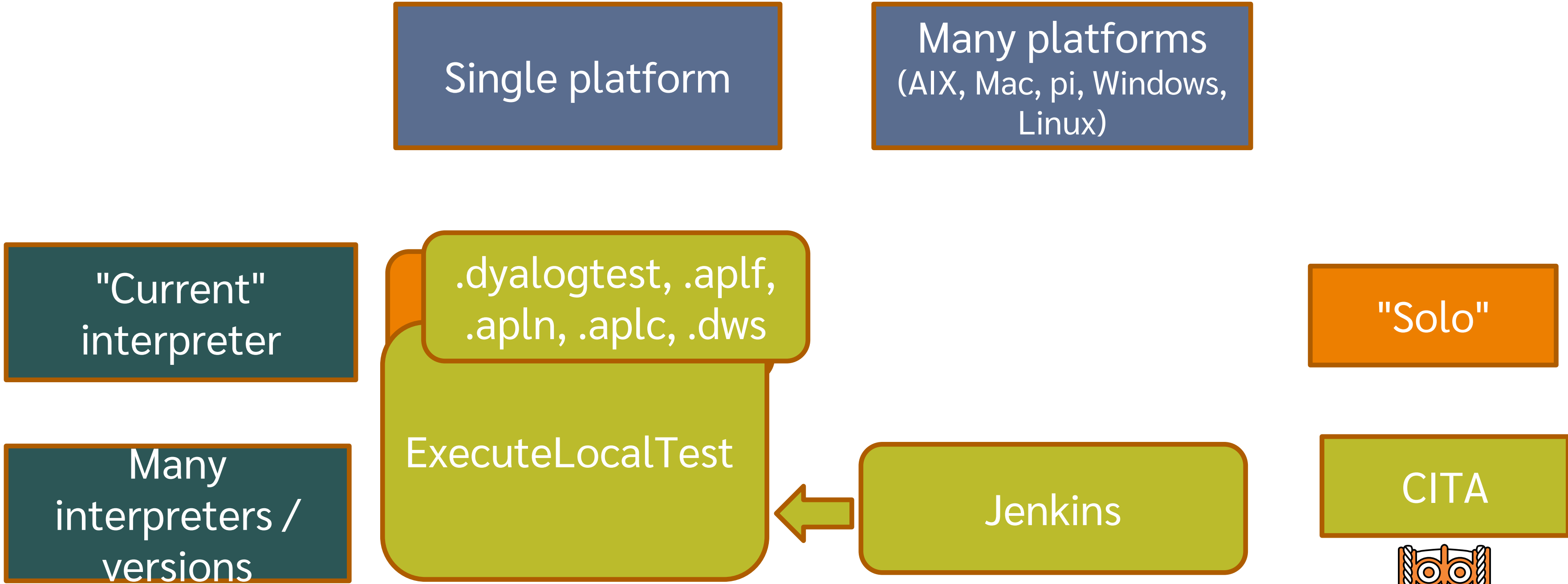
calTest

New dog, new tricks

"Solo"

CITA

Multidimensional testing



Single platform

Many platforms
(AIX, Mac, pi, Windows, Linux)

"Current" interpreter

Many interpreters / versions

.dyalogtest, .aplf, .apln, .aplc, .dws

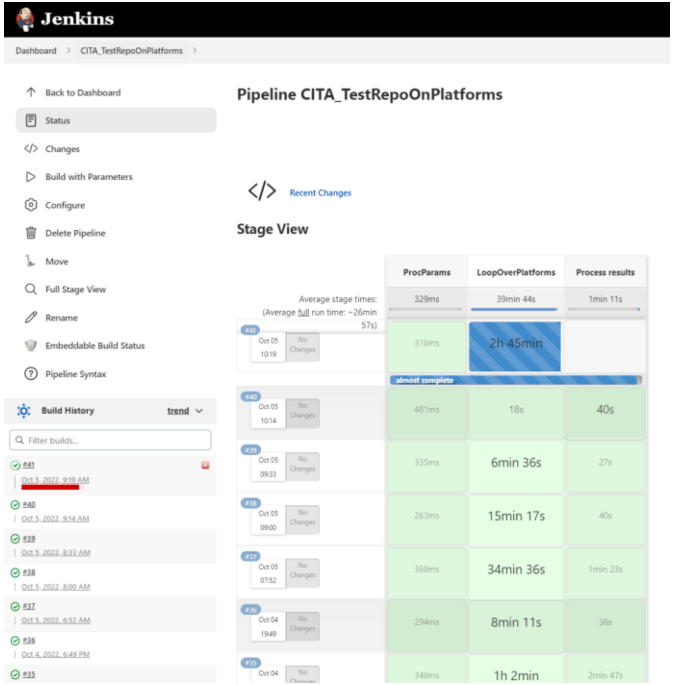
ExecuteLocalTest

Jenkins

"Solo"

CITA

Running a test



Jenkins

Dashboard > CITA_TestRepoOnPlatforms >

- Back to Dashboard
- Status
- Changes
- Build with Parameters
- Configure
- Delete Pipeline
- Move
- Full Stage View
- Rename
- Embeddable Build Status
- Pipeline Syntax

Build History trend

Filter builds...

- #41 Oct 5, 2022, 9:19 AM
- #40 Oct 5, 2022, 9:14 AM
- #39 Oct 5, 2022, 8:33 AM
- #38 Oct 5, 2022, 8:00 AM
- #37 Oct 5, 2022, 6:52 AM
- #36 Oct 4, 2022, 6:49 PM
- #35

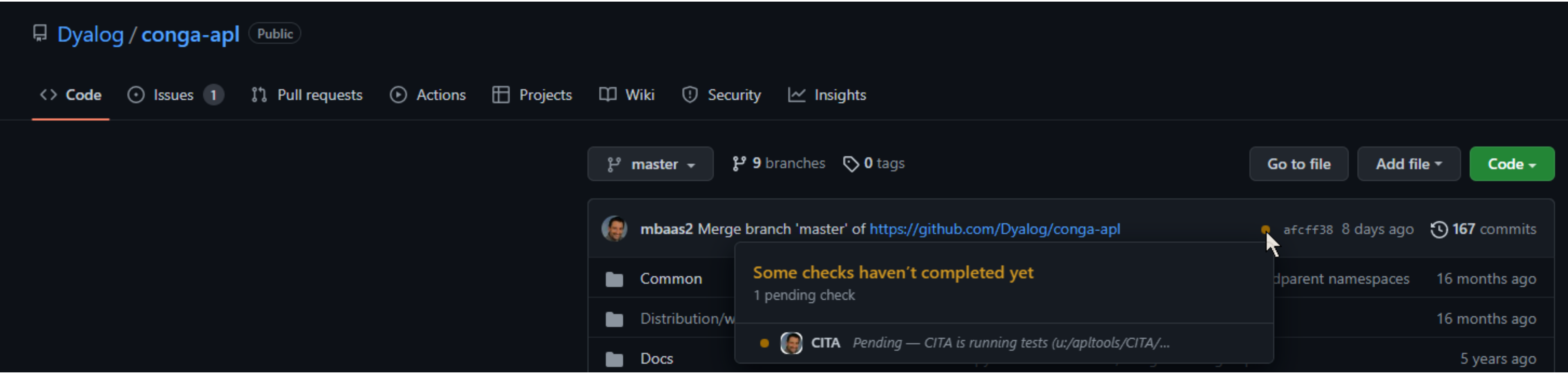
Pipeline CITA_TestRepoOnPlatforms

Recent Changes

Stage View

	ProcParams	LoopOverPlatforms	Process results
Average stage times: (Average full run time: ~26min 57s)	329ms	39min 44s	1min 11s
#41 Oct 05 10:19 No Changes	316ms	2h 45min	
	almost complete		
#40 Oct 05 10:14 No Changes	481ms	18s	40s
#39 Oct 05 09:33 No Changes	335ms	6min 36s	27s
#38 Oct 05 09:00 No Changes	263ms	15min 17s	40s
#37 Oct 05 07:52 No Changes	368ms	34min 36s	1min 23s
#36 Oct 04 19:49 No Changes	294ms	8min 11s	36s
#35 Oct 04 No Changes	346ms	1h 2min	2min 47s

Running a test



mbaas2 Merge branch 'master' of https://github.com/Dyalog/conga-apl afcff38 8 days ago 167 commits

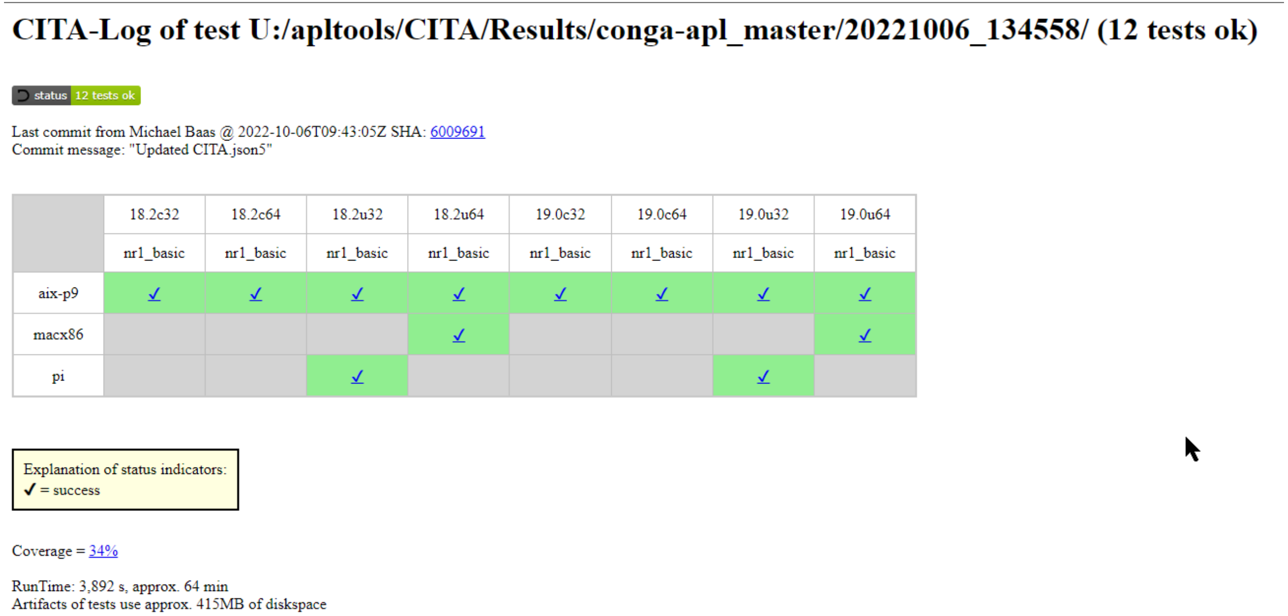
Some checks haven't completed yet

1 pending check

● CITA *Pending — CITA is running tests (u:/apltools/CITA/...*

Common	dparent namespaces	16 months ago
Distribution/w		16 months ago
Docs		5 years ago

Result



CITA-Log of test U:/apltools/CITA/Results/conga-apl_master/20221006_134558/ (12 tests ok)

status 12 tests ok

Last commit from Michael Baas @ 2022-10-06T09:43:05Z SHA: 6009691
Commit message: "Updated CITA.json5"

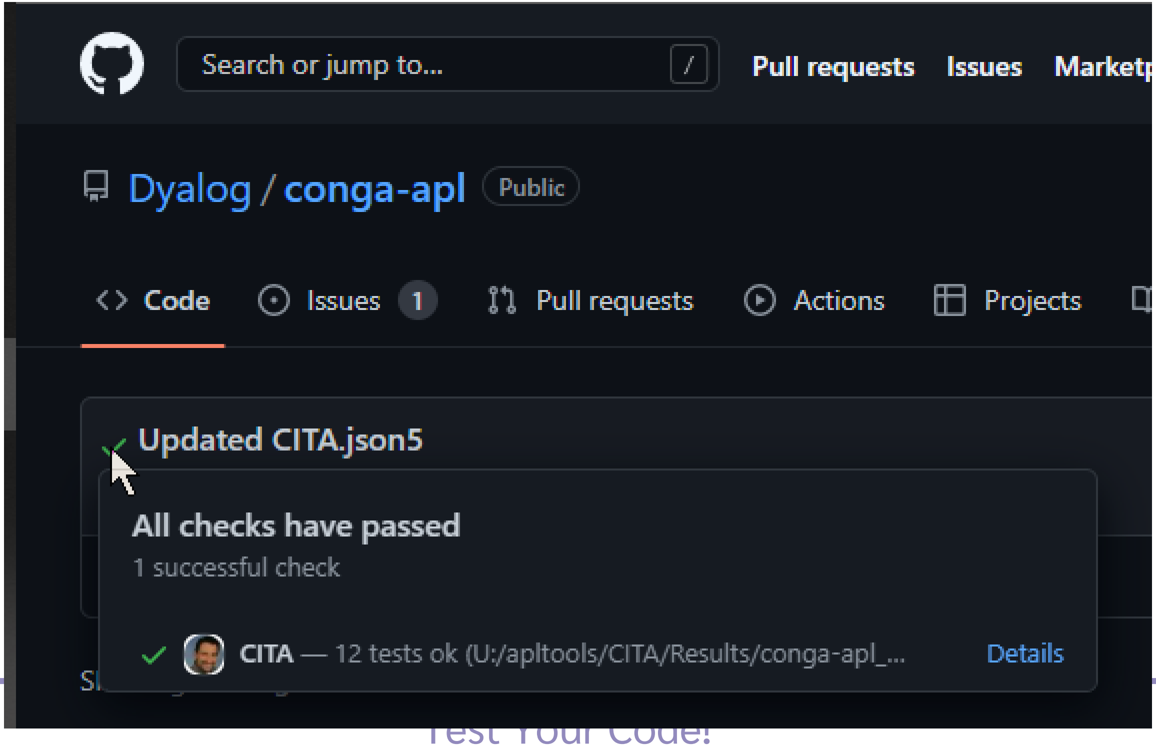
	18.2c32	18.2c64	18.2u32	18.2u64	19.0c32	19.0c64	19.0u32	19.0u64
	nr1_basic	nr1_basic	nr1_basic	nr1_basic	nr1_basic	nr1_basic	nr1_basic	nr1_basic
aix-p9	✓	✓	✓	✓	✓	✓	✓	✓
macx86				✓				✓
pi			✓				✓	

Explanation of status indicators:
✓ = success

Coverage = 34%

RunTime: 3,892 s, approx. 64 min
Artifacts of tests use approx. 415MB of diskspace

Result



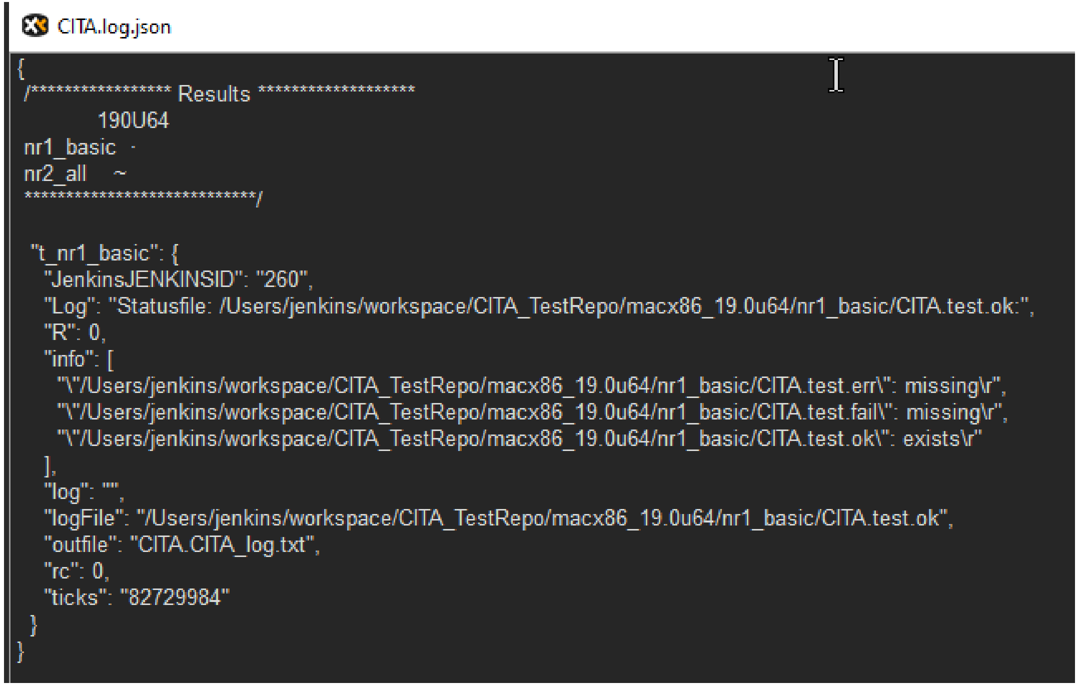
Updated CITA.json5

All checks have passed

1 successful check

✓ CITA — 12 tests ok (U:/apltools/CITA/Results/conga-apl_...

and for further processing:



CITA.log.json

```
{
 /***************** Results *******************
          190U64
 nr1_basic  ·
 nr2_all    ~
 *****************************/

  "t_nr1_basic": {
    "JenkinsJENKINSID": "260",
    "Log": "Statusfile: /Users/jenkins/workspace/CITA_TestRepo/macx86_19.0u64/nr1_basic/CITA.test.ok:",
    "R": 0,
    "info": [
      "\"/Users/jenkins/workspace/CITA_TestRepo/macx86_19.0u64/nr1_basic/CITA.test.err\": missing\r",
      "\"/Users/jenkins/workspace/CITA_TestRepo/macx86_19.0u64/nr1_basic/CITA.test.fail\": missing\r",
      "\"/Users/jenkins/workspace/CITA_TestRepo/macx86_19.0u64/nr1_basic/CITA.test.ok\": exists\r"
    ],
    "log": "",
    "logFile": "/Users/jenkins/workspace/CITA_TestRepo/macx86_19.0u64/nr1_basic/CITA.test.ok",
    "outfile": "CITA.CITA_log.txt",
    "rc": 0,
    "ticks": "82729984"
  }
}
```

When to test?

- **C**ITA – **C**ontinously!
  - **A**lmost…
  - **A**t least on every **c**ommit!
- You may want to test locally before committing…

Not one man in a garage

- Adam: APLCart, UCMDs
- Andy & Jason: scripting & Jenkins knowledge
- Brian: HttpCommand, Jarvis
- Bjorn: Conga, Cryptographic Library
- Morten: initiator
- Richard: regex, startup
- Vince: support, APLCORE analysis
- ...and more...