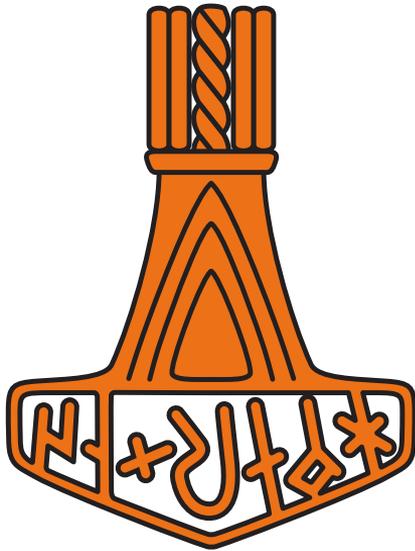


# DYALOG

Elsinore 2019



## The 2019 APL Problem Solving Competition

*Brian Becker, Dyalog, LTD*

# This year's contest...

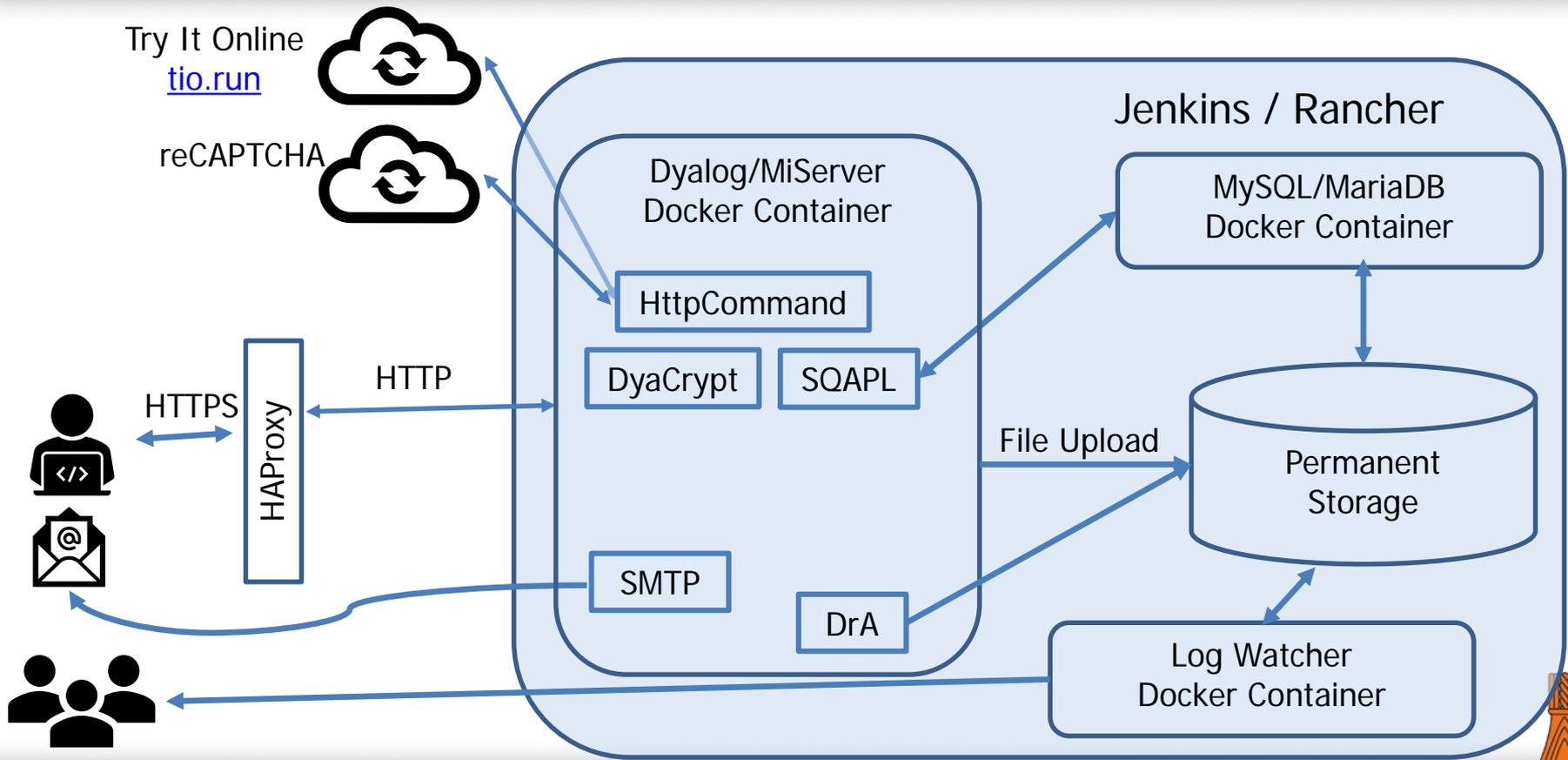
- ◆ Our 11<sup>th</sup> (and counting)
- ◆ Phase I consists of 10 "one-liner" problems
- ◆ Phase II - 3 groups each of Easy, Medium and Difficult problem sets covering domains including Bioinformatics, Mathematics, Data Science, Gaming, Cryptography, Language Processing and Recreational Computing.
- ◆ Oh, and we built the website and hosted it ourselves...



# Dogfooding (using your **own** products)

- **MiServer** – web server
- **HttpCommand** – remote system integration
- **SMTP** – email utility class
- **Dyalog Crypto Library** – password hashing
- **Conga** – used by MiServer, HttpCommand, SMTP
- **DrA** – error logging utility
- **SQAPL** – database access
- **TryItOnline** – Phase I validation
- Git/GitHub – source code mgmt
- Docker - containers
- Jenkins – continuous integration
- Rancher - deployment
- HAProxy – HTTPS
- reCAPTCHA – anti-spam





- Up
- Status
- Changes
- Build Now
- View Configuration
- Full Stage View
- GitHub
- Pipeline Syntax

## Branch master

Full project name: Dyalog\_Github/contest/master



### Stage View

**Build History** [trend](#)

- #598 Aug 25, 2019 9:48 PM
- #597 Aug 20, 2019 5:49 PM
- #596 Aug 6, 2019 8:56 AM
- #595 Jul 31, 2019 10:40 AM
- #594 Jul 31, 2019 10:33 AM
- #593 Jul 31, 2019 10:28 AM
- #592 Jul 30, 2019 3:45 PM
- #591 Jul 30, 2019 12:24 PM
- #590 Jul 30, 2019 12:07 PM
- #589 Jul 27, 2019 1:01 AM
- #588 Jun 21, 2019 2:00 PM
- #587 Jun 17, 2019 12:31 PM

Average stage times:  
(Average full run time: ~2min 31s)

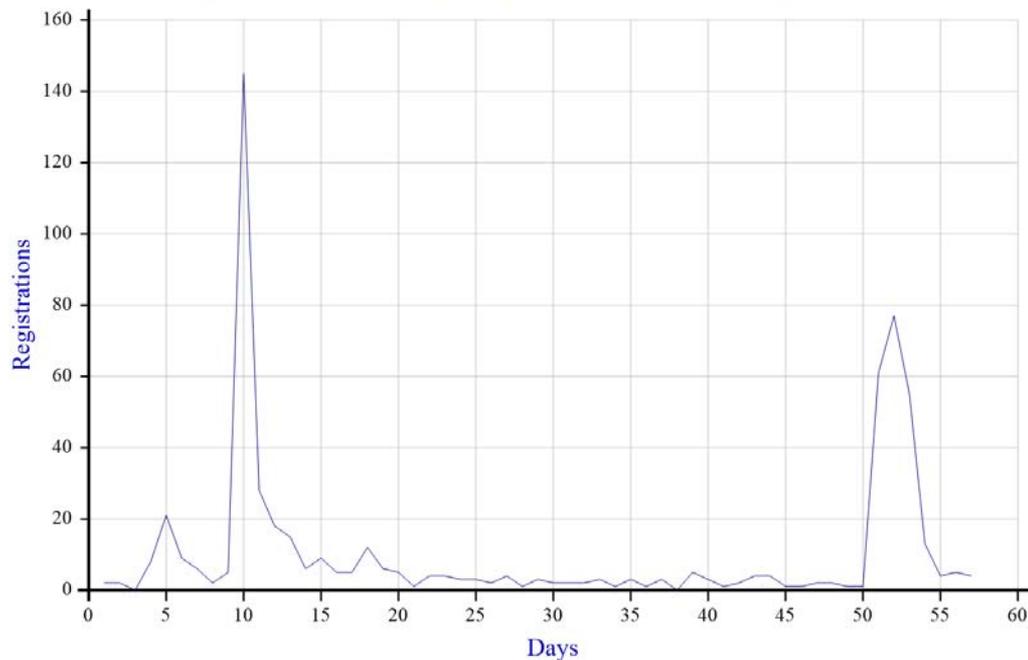
Build #	Date	Commit
#598	Aug 25	1 commit
#597	Aug 20	No Changes
#596	Aug 06	1 commit
#595	Jul 31	1 commit
#594	Jul 31	1 commit

	Checkout	Update MiServer	Build Docker Image	Test website	Publish Docker image	Deploying with Rancher	Cleanup
Average	8s	40s	16s	38s	12s	28s	1s
#598	6s	41s	13s	36s	11s	24s	1s
#597	5s	42s	12s	35s	11s	37s	1s
#596	6s	50s	16s	35s	14s	26s	1s
#595	4s	33s	7s	35s	11s	23s	912ms
#594	5s	33s	9s	36s	11s	27s	918ms



# Some Statistics

## Registrations by Day into the Competition



## Some Statistics

478 Phase I solutions were submitted,  
an average of almost 48 solutions per problem

68 people had at least 1 passing Phase I entry

25 people submitted for Phase II of which 13  
students and 6 non-students qualified for prize  
consideration

858 registered users from 89 countries  
(252 didn't list a country)

Unspecified	252
India	197
Nigeria	56
United States	26
Ghana	25
Pakistan	17
United Kingdom	16
Egypt	16
Kenya	13
Malawi	11
Canada	10
Sweden	10



# Reactions

The problems were nice, splitting the challenges in sets & difficulties allowed me to skip stuff I don't like.

I am 17 years old and have been interested in programming for a long time. A couple years ago I found out about the Code Golf community in StackExchange, where, after a while, I was introduced to APL, and **was immediately interested, because `1 2 3+10 worked`**.. Little by little, I learned the language, and **now it's often my everyday calculator**.



# Reactions

This contest was a lot of fun! I think some guidance on how to use the Dyalog APL environment might be helpful for people picking it up for the first time ... but for the most part the problems had just the right amount of difficulty, and the competition website is robust and well-designed.

I'm a computer science student heading into UC San Diego in the fall. ... I'd like to get into APL (of course :) and Idris in the future



# Reactions

Of the three years that I have entered this competition, this one has been my favourite. I really liked the problems, and the updated web interface for stage one saved a lot of time. If I had one suggestion it would be to add a similar web interface for phase two next year.

I am 14 years old. This is my third year entering this competition.



# Reactions

I really enjoyed solving the problems in the competition, **it helped me to gain new information and to change how I think when I write a computer code**, the competition is great and currently I have no thoughts that could make it even better, keep it up.

I am 17 years old high school student. I know how to code in Python and JavaScript .



# Reactions

Compared to the previous two years, the phase II competition structure definitely changed. I am glad that a different set can be chosen from each difficulty. I had computer difficulties most of the summer, so I am glad that I could work on TIO for most of the competition!



# Reactions

It was hard; it was fun; it was intellectually enriching.

I am a 19-year old living in South Carolina I will be attending Technical College this fall. I found APL to be an excellent way to test and stretch my skills. It forced me to reevaluate the way I think about mathematical problems and to scrutinize every step of the solution.

I will certainly be continuing my studies into APL



# Thank you!

- ◆ Fiserv, SimCorp, and our anonymous sponsors for your continued support
- ◆ Last year's winner Alve Björk and Richard Park for help with problem creation
- ◆ Michael Baas, Adám Brudzewsky and Richard Park for website creation
- ◆ Jason Rivers for continuous integration wizardry
- ◆ Fiona Smith for all the things you do, all the gaps you fill, to make our efforts a success



# And the winners are...

- ◆ Third Place
  - ◆ Douglas Patz (Agile Learning Center, New York, U.S.A.)
- ◆ Second Place
  - ◆ Rasmus Précenth (Uppsala University, Sweden)
- ◆ First Place (non-Student)
  - ◆ Torsten Grust (Germany)
- ◆ Grand Prize
  - ◆ Jamin Wu (Monash University, Australia)

