

# Introduction to Automating System Builds, Workflows, and Configuration Management with GitHub Actions

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June 29, 2021

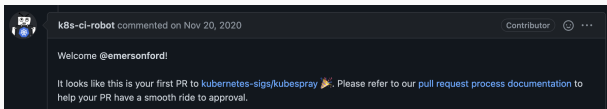
University of Utah — ITX Meeting

- Understanding automation
- How to automate with Github Actions
- Best practices of automation
- Q&A and related topics

# What is automation?

Getting computers do things for you automatically

- building, testing, and publishing artifacts
- linting and auto formatting code
- deploying configurations
- welcome new contributors to your repo

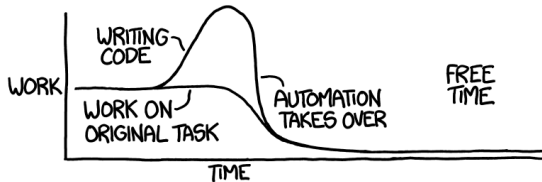


# Why automate?

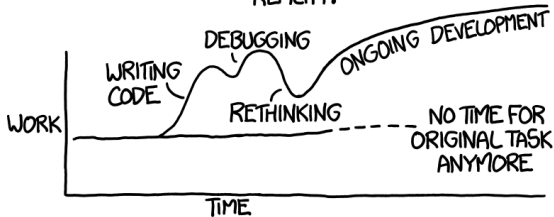
- saves you time and headaches
- ensure consistent workflow runs
- improve visibility, handoff, and usability
- it scales

"I SPEND A LOT OF TIME ON THIS TASK.  
I SHOULD WRITE A PROGRAM AUTOMATING IT!"

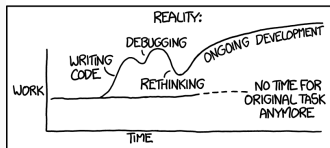
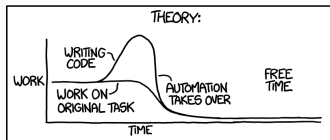
THEORY:



REALITY:



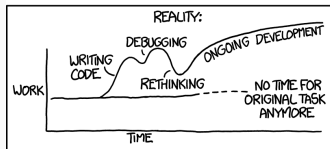
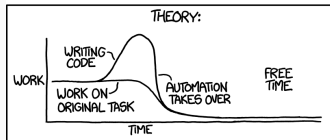
"I SPEND A LOT OF TIME ON THIS TASK.  
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HOW LONG CAN YOU WORK ON MAKING A ROUTINE TASK MORE  
EFFICIENT BEFORE YOU'RE SPENDING MORE TIME THAN YOU SAVE?  
(ACROSS FIVE YEARS)

		HOW OFTEN YOU DO THE TASK					
		50/DAY	5/DAY	DAILY	WEEKLY	MONTHLY	YEARLY
HOW MUCH TIME YOU SHAVE OFF	1 SECOND	1 DAY	2 HOURS	30 MINUTES	4 MINUTES	1 MINUTE	5 SECONDS
	5 SECONDS	5 DAYS	12 HOURS	2 HOURS	21 MINUTES	5 MINUTES	25 SECONDS
	30 SECONDS	4 WEEKS	3 DAYS	12 HOURS	2 HOURS	30 MINUTES	2 MINUTES
	1 MINUTE	8 WEEKS	6 DAYS	1 DAY	4 HOURS	1 HOUR	5 MINUTES
	5 MINUTES	9 MONTHS	4 WEEKS	6 DAYS	21 HOURS	5 HOURS	25 MINUTES
	30 MINUTES		6 MONTHS	5 WEEKS	5 DAYS	1 DAY	2 HOURS
	1 HOUR		10 MONTHS	2 MONTHS	10 DAYS	2 DAYS	5 HOURS
	6 HOURS				2 MONTHS	2 WEEKS	1 DAY
	1 DAY					8 WEEKS	5 DAYS

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6 HOURS				2 MONTHS	2 WEEKS	1 DAY
1 DAY					8 WEEKS	5 DAYS

HOW MUCH TIME YOU SHAVE OFF

CHECK IT OUT—I MADE A FULLY AUTOMATED DATA PIPELINE THAT COLLECTS AND PROCESSES ALL THE INFORMATION WE NEED



IS IT A GRANT HOUSE OF CARDS BUILT FROM RANDOM SCRIPTS THAT WILL ALL COMPLETELY COLLAPSE THE MOMENT ANY INPUT DOES ANYTHING WEIRD?



IT... MIGHT NOT BE.

I GUESS THAT'S SOMETHING WHOOPS, JUST COLLAPSED. HANG ON, I CAN PATCH IT.

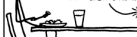


CAN YOU PASS THE SALT?



I SAID—I KNOW I'M DEVELOPING A SYSTEM TO PASS YOU ARBITRARY CONDIMENTS. IT'S BEEN 20 MINUTES!

IT'LL SAVE TIME IN THE LONG RUN!



WHAT DO YOU DO?

I MAKE TOOLS THAT MAKE TOOLS



...THAT MONITOR CODE THAT DEPLOYS TOOLS THAT BUILD TOOLS FOR DEPLOYING MONITORS...



20 MINUTES LATER...

...FOR MONITORING DEPLOYMENT OF TOOLS FOR— BUT WHAT'S IT ALL FOR?



HONESTLY, NO IDEA. FORM, PROBABLY.

THE #1 PROGRAMMER EXCUSE FOR LEGITIMATELY SLACKING OFF:

"MY CODE'S COMPILING."

HEY! GET BACK TO WORK!



# How to Automate



- free product from Github for public repos
- “on-demand” VMs / containers
- triggered from git actions (push, pull request, etc)
- executions steps described in yaml

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main 1 branch 0 tags

Go to file Add file + Code +

emersonford init commit 6867774 2 minutes ago 1 commit

.gitignore init commit 2 minutes ago

Makefile init commit 2 minutes ago

presentation.pdf init commit 2 minutes ago

presentation.tex init commit 2 minutes ago

Help people interested in this repository understand your project by adding a README. Add a README

About

Presentation to the University of Utah ITX group on "Introduction to Automating System Builds, Workflows, and Configuration Management with GitHub Actions" on June 29th.

Releases

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Actions emersonford/tx-asis

https://github.com/emersonford/tx-presentation/actions/new

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## Get started with GitHub Actions

Build, test, and deploy your code. Make code reviews, branch management, and issue triaging work the way you want. Select a workflow template to get started.

Skip this and [set up a workflow yourself](#) →

### Workflows made for your TeX repository Suggested

Simple workflow

By GitHub

Start with a file with the minimum necessary structure.

Set up this workflow

echo Hello, world!  
echo Add other actions to build,  
echo test, and deploy your project.

actions/starter-workflows

### Deploy your code with these popular services

Deploy Node.js to Azure Web App

By Microsoft Azure

Build a Node.js project and deploy it to an Azure Web App.

Deploy to Alibaba Cloud ACK

By Alibaba Cloud

Deploy a container to Alibaba Cloud Container Service for Kubernetes (ACK).

Deploy to Amazon ECS

By Amazon Web Services

Deploy a container to an Amazon ECS service powered by AWS Fargate or Amazon EC2.

https://github.com/emersonford/tx-presentation/actions

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itx-presentation / .github / workflows / main.yml in main

Cancel changesStart commit -

Edit new filePreview

Spaces 020No wrap 0

```
1 # This is a basic workflow to help you get started with Actions
2
3 name: CI
4
5 # Controls when the workflow will run
6 on:
7   # Triggers the workflow on push or pull request events but only for the main branch
8   push:
9     branches: [ main ]
10   pull_request:
11     branches: [ main ]
12
13 # Allows you to run this workflow manually from the Actions tab
14 workflow_dispatch:
15
16 # A workflow run is made up of one or more jobs that can run sequentially or in parallel
17 jobs:
18   # This workflow contains a single job called "build"
19   build:
20     # The type of runner that the job will run on
21     runs-on: ubuntu-latest
22
23     # Steps represent a sequence of tasks that will be executed as part of the job
24     steps:
25       # Checks-out your repository under $GITHUB_WORKSPACE, so your job can access it
26       - uses: actions/checkout@v2
27
28       # Runs a single command using the runners shell
29       - name: Run a one-line script
30         run: echo Hello, world!
31
```

Use **Control** + **Space** to trigger autocomplete in most situations.

MarketplaceDocumentation

Search Marketplace for Actions

Featured Actions

Setup Node.js environment

By actions

Setup a Node.js environment by adding problem matchers and optionally downloading and adding it to the PATH

1.2k

Close Stale Issues

By actions

Close issues and pull requests with no recent activity

416

Download a Build Artifact

By actions

Download a build artifact that was previously uploaded in the workflow by the upload-artifact action

345

Setup .NET Core SDK

By actions

Used to build and publish .NET source. Set up a specific version of the .NET and authentication to private NuGet repository

303

First Interaction

By actions

Greet new contributors when they create their first issue or open their first pull request

109

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