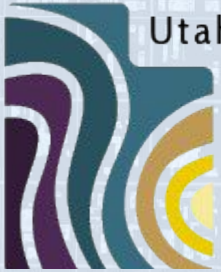
Keeping My Head in the Clouds:

Leveraging Google Cloud Run for Automated Tasks

division of Technology Services



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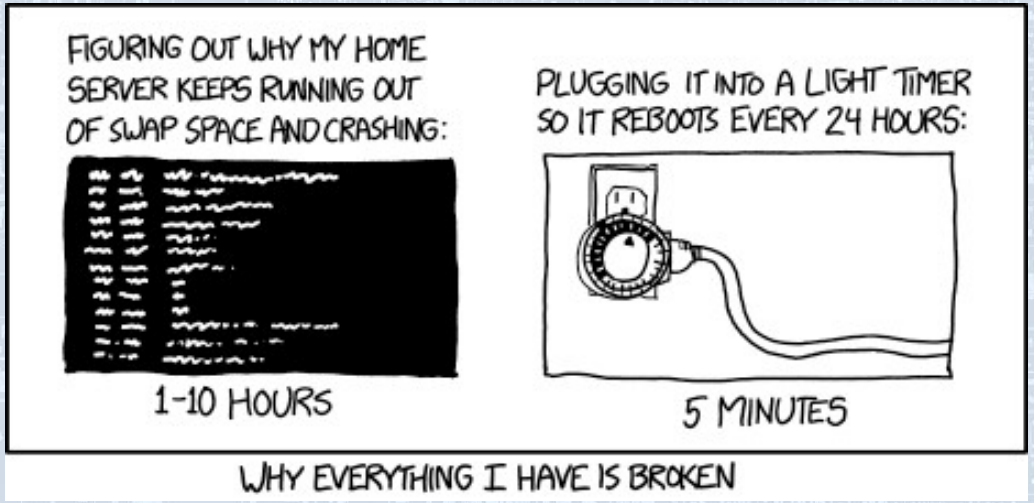
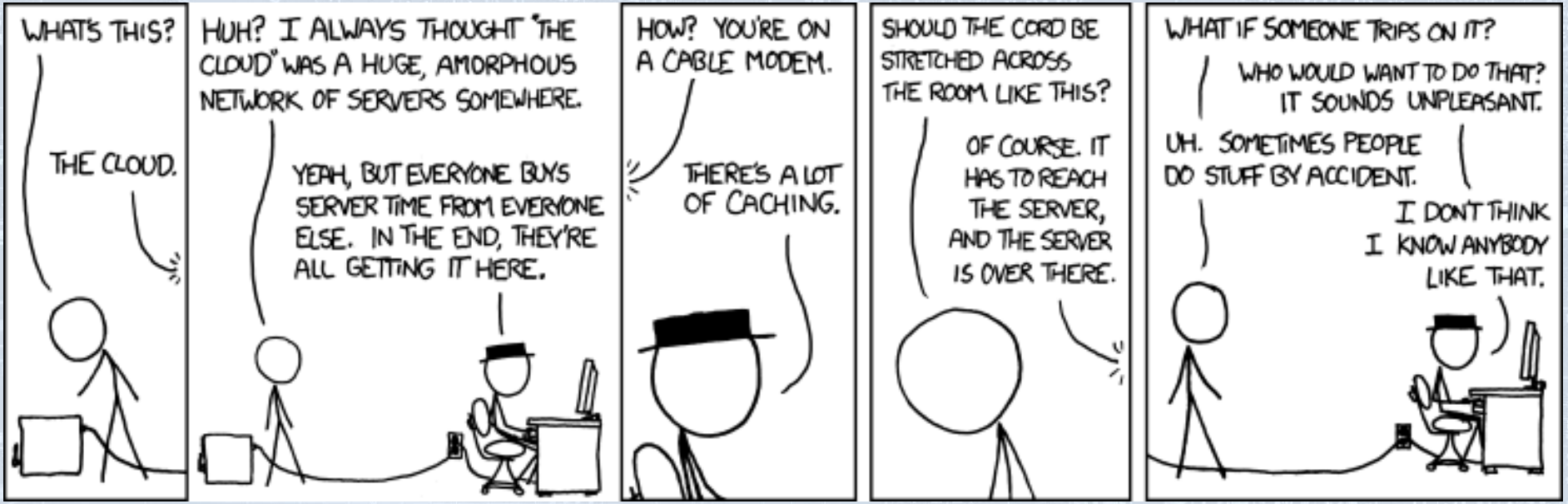
The Scenario

How do I run a script on a regular basis without having to stand up, maintain, and secure my own server?



Source: https://xkcd.com/1495/

The Solution: The Cloud



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Source: https://xkcd.com/908/

The Cloud

Pros:

You don't have to manage the infrastructure. No servers to patch, no failed hardware to fix at 3:00 AM.

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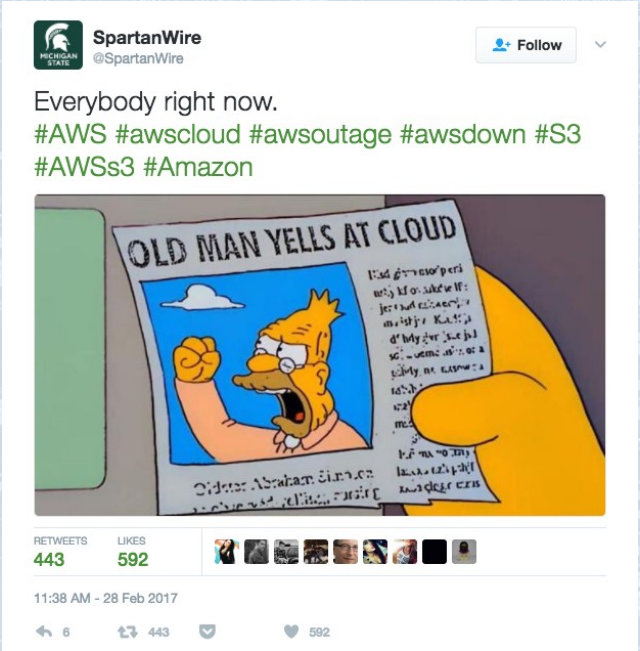
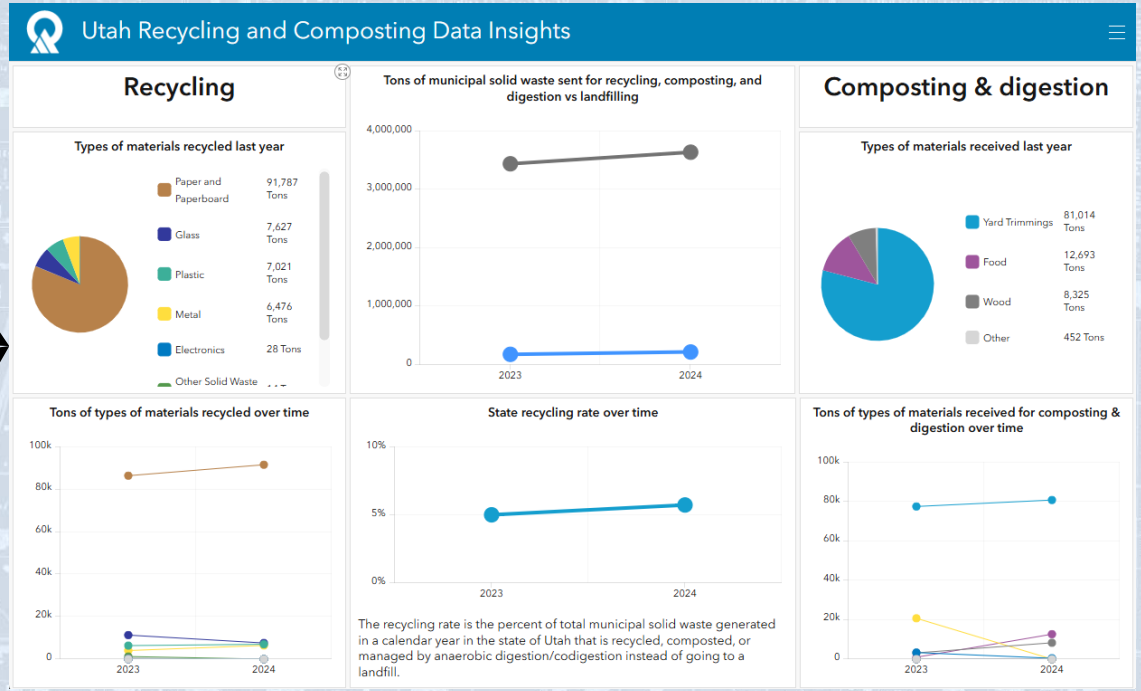


Examples

Google Sheets

salesforce



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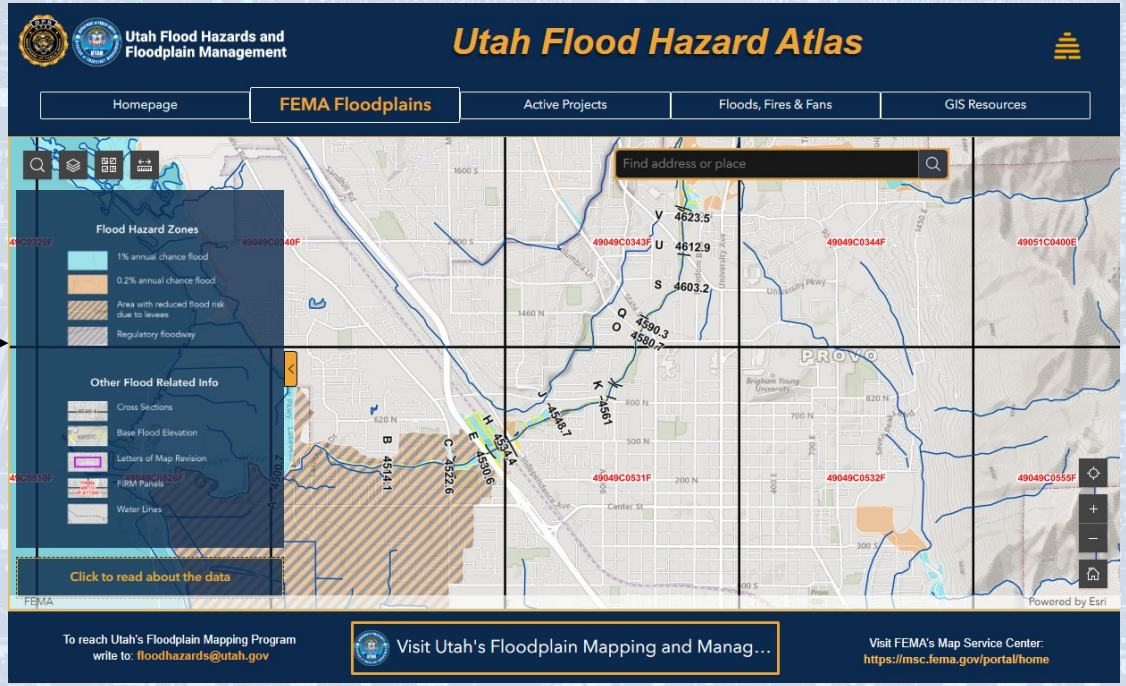
https://recycle.utah.gov

Examples

FEMA



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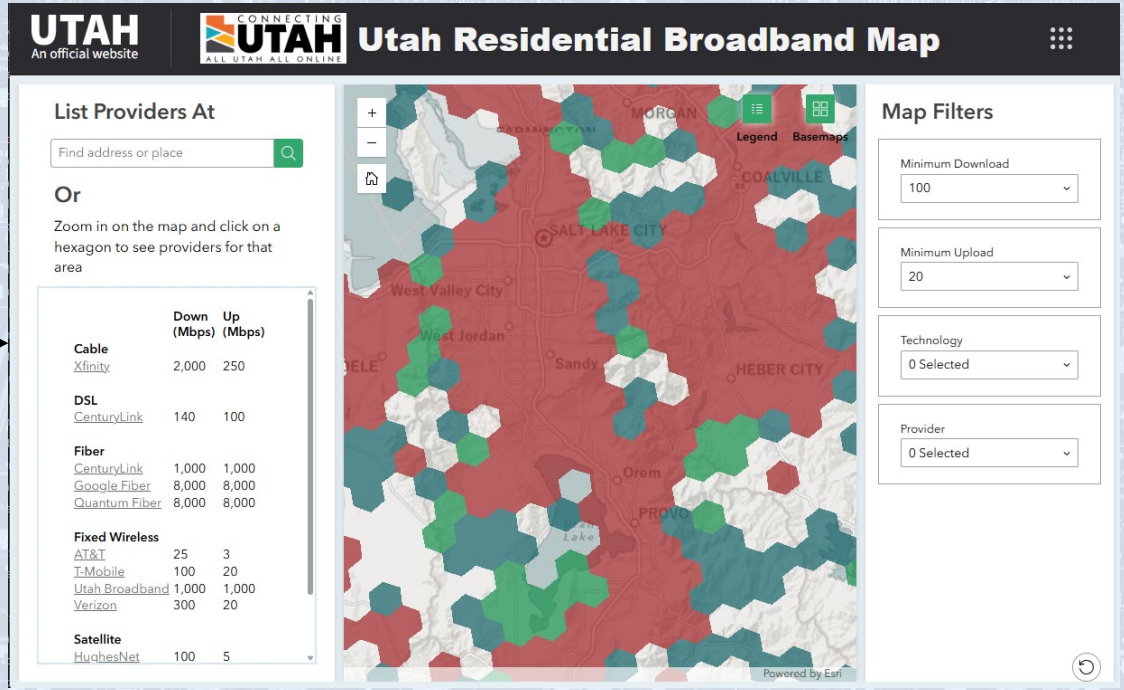
https://experience.arcgis.com/experience/646356d3a2eb4db4bf6397edff54c09d

Examples

Federal Communications Commission



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https://broadband.ugrc.utah.gov

Google Cloud Run

- Your **Script**
- Running in a **Docker Container**
- In the **Google Cloud Platform**
- Started by various **Triggers**

Your Script

```
In setup.py:
setup(
    …
    packages=find_packages("src"),
    package_dir={"": "src"},
    include_package_data=True,
    install_requires=["ugrc-palletjack>=5.0,<6.1","ugrc-supervisor>=3.1.3"],
    entry_points={"console_scripts": [
            "project-portal-skid = project_portal_skid.main:process"]
    },
)
```

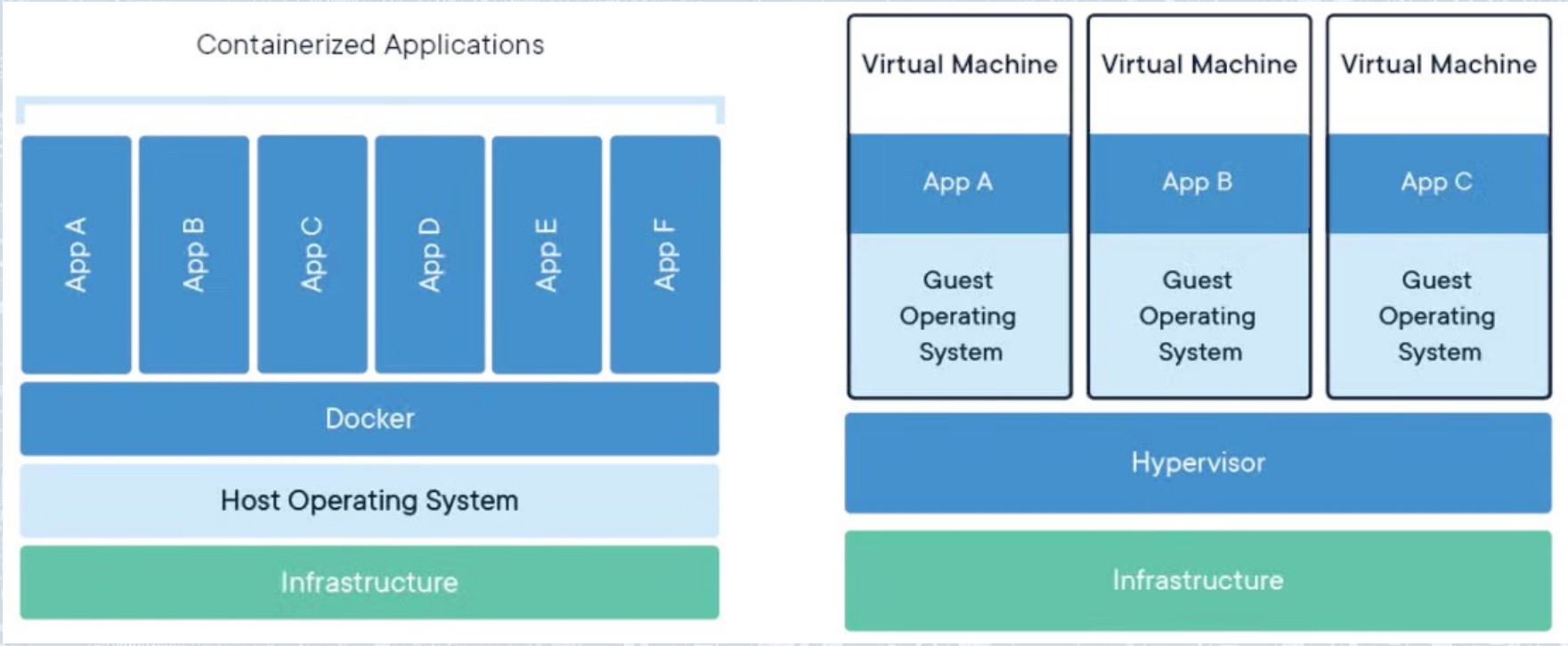
Docker Containers

Docker Containers

A container is a standard unit of software that packages up code and all its dependencies so the application runs quickly and reliably from one computing environment to another … [It] includes everything needed to run an application: code, runtime, system tools, system libraries and settings.

Source: https://www.docker.com/resources/what-container/

Docker Containers



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Source: https://www.docker.com/resources/what-container/

Dockerfile

```
FROM python:3.11-slim
# Allow statements and log messages to immediately appear in the Knative logs
ENV PYTHONUNBUFFERED=True
USER root
RUN useradd -s /bin/bash dummy
# Set the locale
RUN apt-get update && apt-get install -y locales && localedef -i en_US -c -f UTF-8 -A
/usr/share/locale/locale.alias en_US.UTF-8 && apt-get install -y gcc && apt-get install -y
libkrb5-dev && pip install requests-kerberos
COPY . /app
WORKDIR /app
RUN pip install .
USER dummy
ENTRYPOINT ["broadband-data"]
```

The Google Cloud Platform

Google Cloud

The Google Cloud Platform

Google Cloud Platform	Amazon Web Services[51]	Microsoft Azure[52]	Oracle Cloud[53]
Google Compute Engine	Amazon EC2	Azure Virtual Machines	Oracle Cloud Infra OCI
Google App Engine	AWS Elastic Beanstalk	Azure App Services	Oracle Application Container
Google Kubernetes Engine	Amazon Elastic Kubernetes Service	Azure Kubernetes Service	Oracle Kubernetes Service
Google Cloud Bigtable	Amazon DynamoDB	Azure Cosmos DB	Oracle NoSQL Database
Google BigQuery	Amazon Redshift	Azure Synapse Analytics	Oracle Autonomous Data Warehouse
Google Cloud Functions	AWS Lambda	Azure Functions	Oracle Cloud Fn
Google Cloud Datastore	Amazon DynamoDB	Azure Cosmos DB	Oracle NoSQL Database
Google Cloud Storage	Amazon S3	Azure Blob Storage	Oracle Cloud Storage OCI

Source: Wikipedia

Tiggers

Cloud Run Service:

A script that responds to an HTTPS request sent to a REST endpoint

- When some client sends an HTTP GET request, perform an action

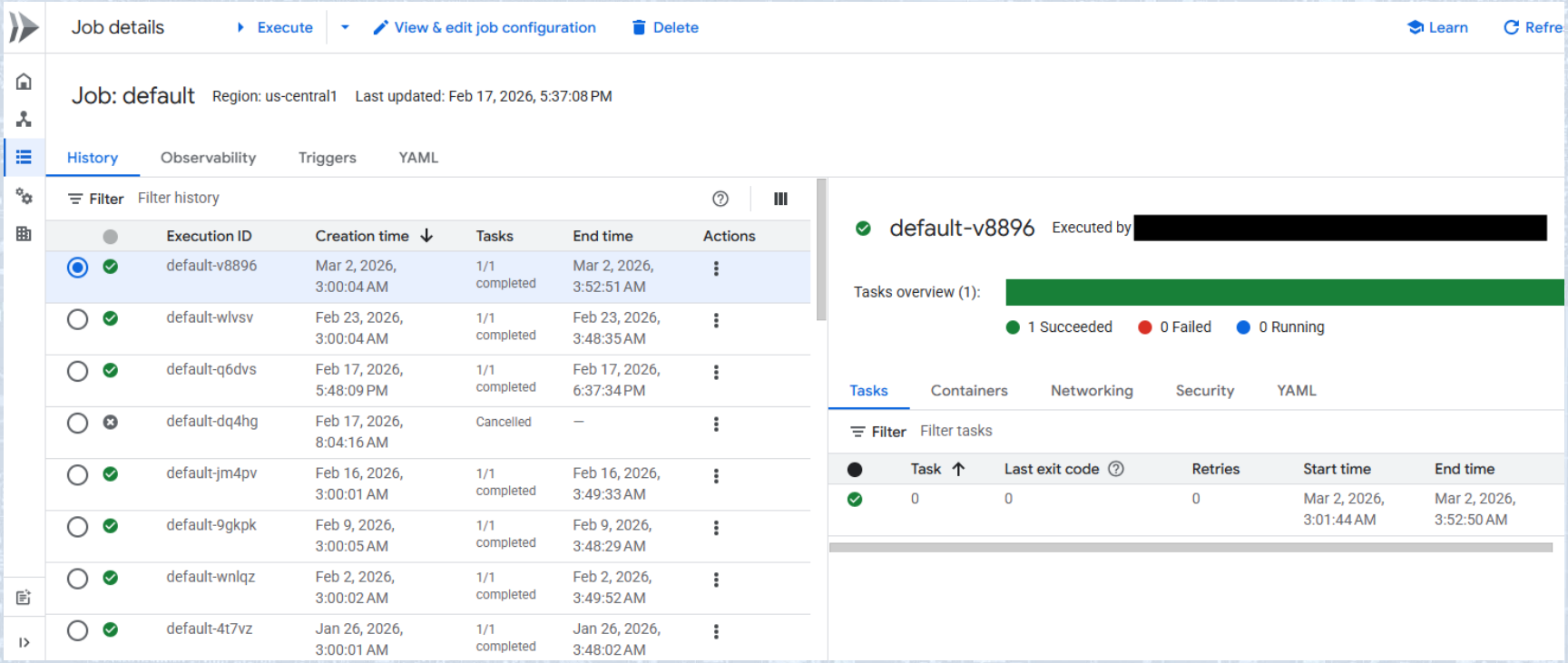
Cloud Run Job:

A script that runs based on a Cloud Scheduler trigger or Cloud Workflow

- Run this script every Monday morning at 3:00 AM

Source: https://docs.cloud.google.com/run/docs/overview/what-is-cloud-run

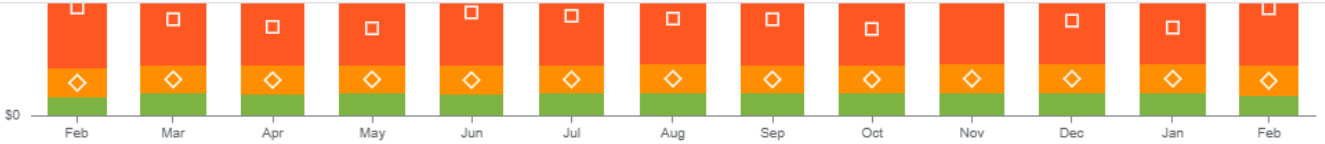
Scheduled Job



Show Me the Money

Group by (Service) | Time range by invoice month (February 2025 – February 2026) | Projects (1 of 142)

Invoice level charges (All) | Show more



Download CSV

Service	Usage cost	Savings programs	Other savings	Subtotal	% Change
Artifact Registry	$7.93	–	–	$7.93	↑ 19%
Cloud Run	$5.07	–	–	$5.07	↑ 9%
Secret Manager	$1.50	–	–	$1.50	↑ 1%
Cloud Scheduler	$1.11	–	–	$1.11	↑ 6%

Subtotal	$15.62
Filtered total	$15.62

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Palletjack and Skids

- github.com/ugrc/palletjack
- github.com/ugrc/skid

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Utah Geospatial Resource Center

gis.utah.gov/presentations

jdadams@utah.gov

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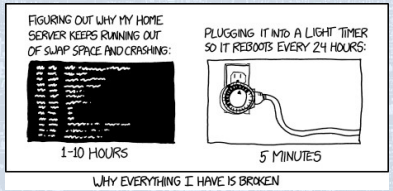

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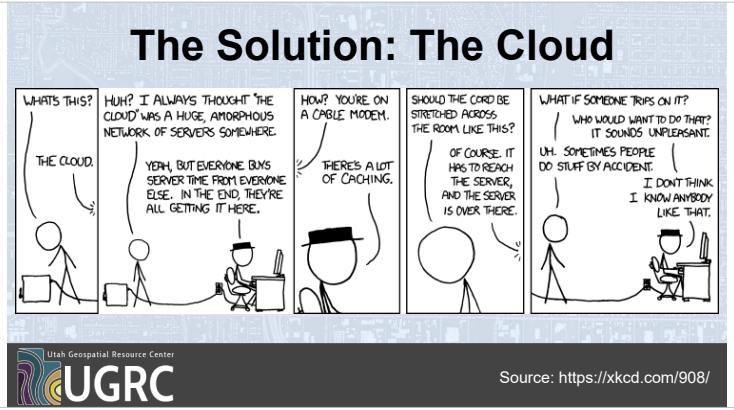
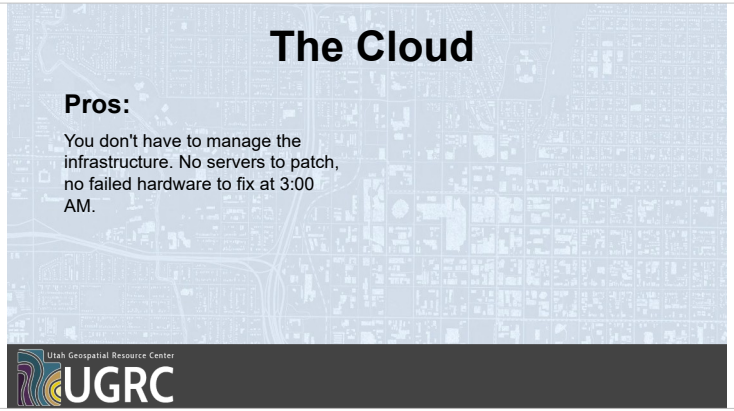
Source: https://xkcd.com/1495/

Running your own server is difficult and comes with lots of responsibilities. How do we sidestep those so we can spend more time GISing?



The solution: run it in the cloud. What is the cloud? Someone else's computer, and network, and problem.



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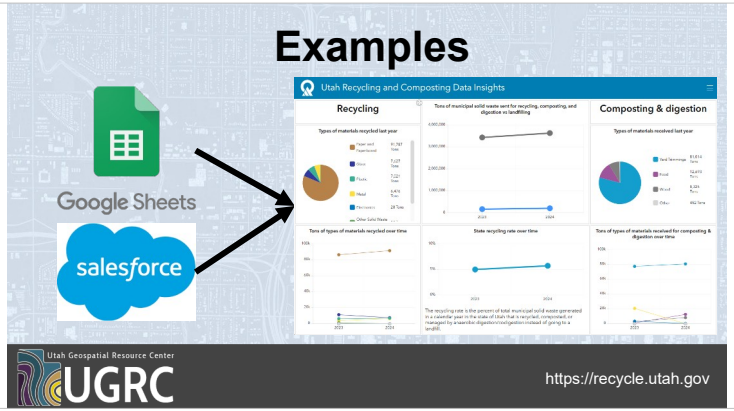
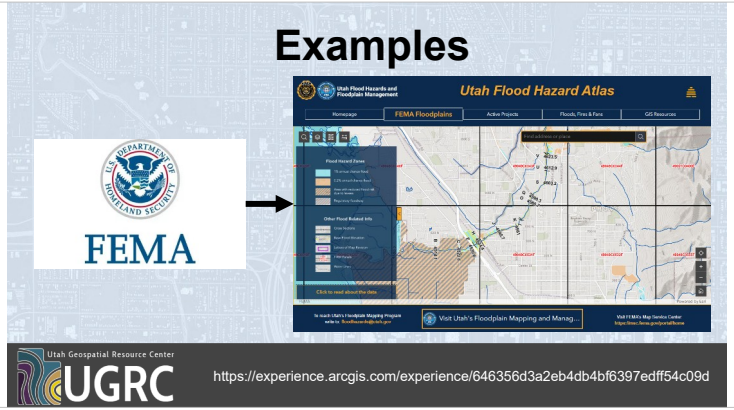
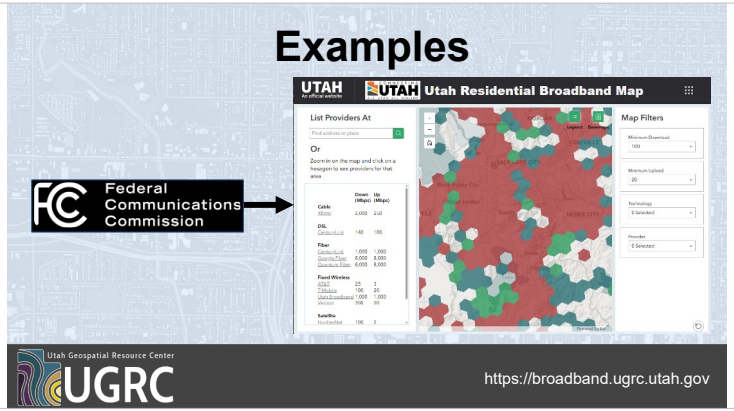


Utah Recycling and Waste Facility Map and Dashboard uses data from both Google Sheets and Salesforce, updated weekly.



We make a copy of the FEMA floodplain feature services on a weekly basis for the Department of Emergency Management

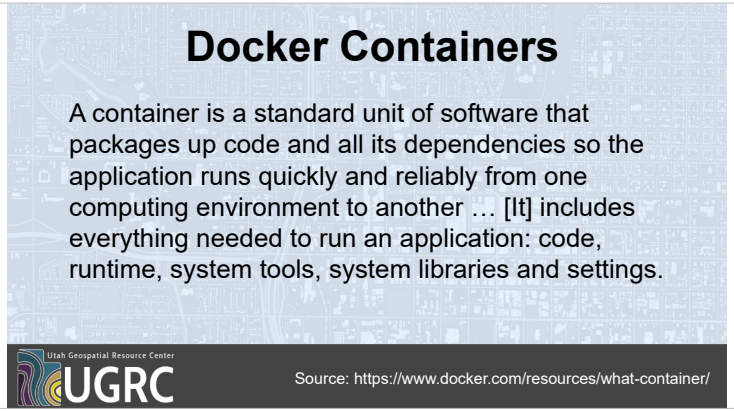


The Utah Residential Broadband Map uses data extracted from the FCC's API on a monthly basis

The solution: Run it in the cloud. ie, "serverless"

Make it pip-installable

A container is a portable, lightweight, isolated environment packaged with your code.



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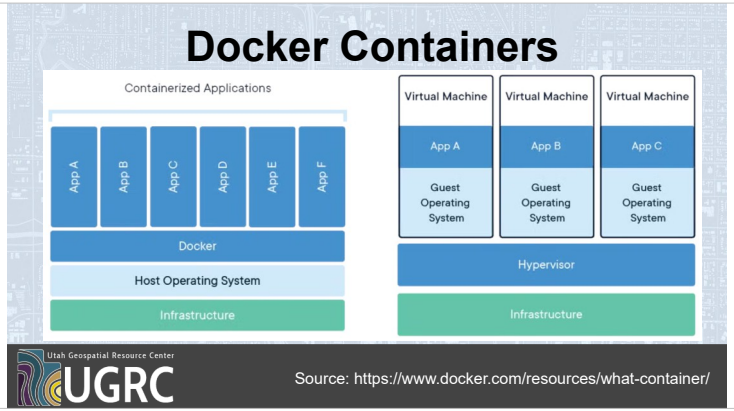

Containers are another step up the abstraction ladder from VMs

Dockerfile

```
FROM python:3.11-slim
# Allow statements and log messages to immediately appear in the Knative logs
ENV PYTHONUNBUFFERED=True
USER root
RUN useradd -s /bin/bash dummy
# Set the locale
RUN apt-get update && apt-get install -y locales && localedef -i en_US -c -f UTF-8 -A
/usr/share/locale/locale.alias en_US.UTF-8 && apt-get install -y gcc && apt-get install -y
libkrb5-dev && pip install requests-kerberos
COPY . /app
WORKDIR /app
RUN pip install .
USER dummy
ENTRYPOINT ["broadband-data"]
```

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Containers are built from a Dockerfile and run using a container manager like Docker or Podman

Cloud run is a product in the Google Cloud Platform, or GCP

The Google Cloud Platform

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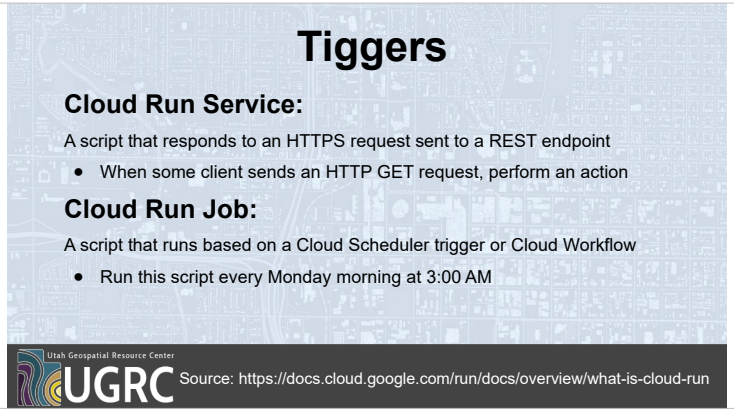
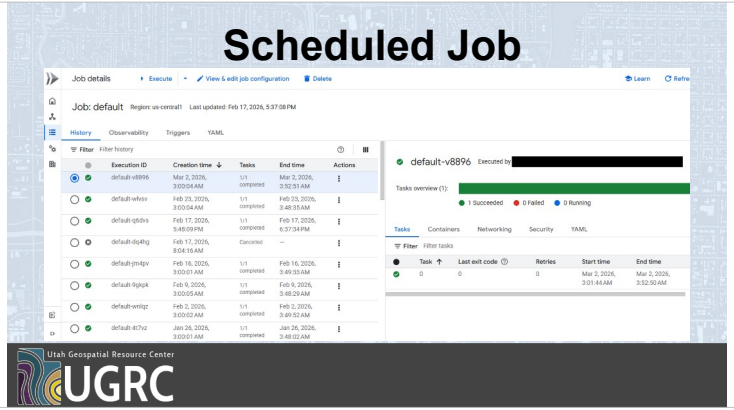
Source: Wikipedia

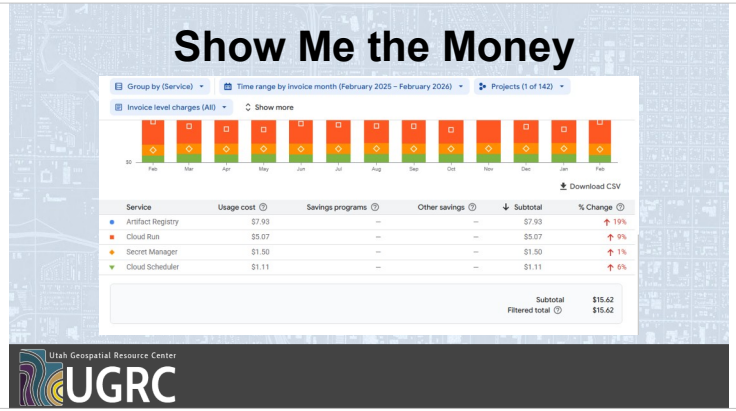
GCP is a wide suite of cloud offerings to provide various levels of infrastructure-as-a-service hosted on Google's servers and network



Cloud run scripts can be kicked off multiple ways. We mainly use Jobs, but are investigating Services for webhook-based workflows



Here's a job that goes off every Monday at 3:00 and runs for about 45 minutes each time



This is my Cloud Run job with the longest runtime- ~50 minutes every week. $15.62 total over a year.

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