Pearson

Get your Machine Learning workflow under control with DVC

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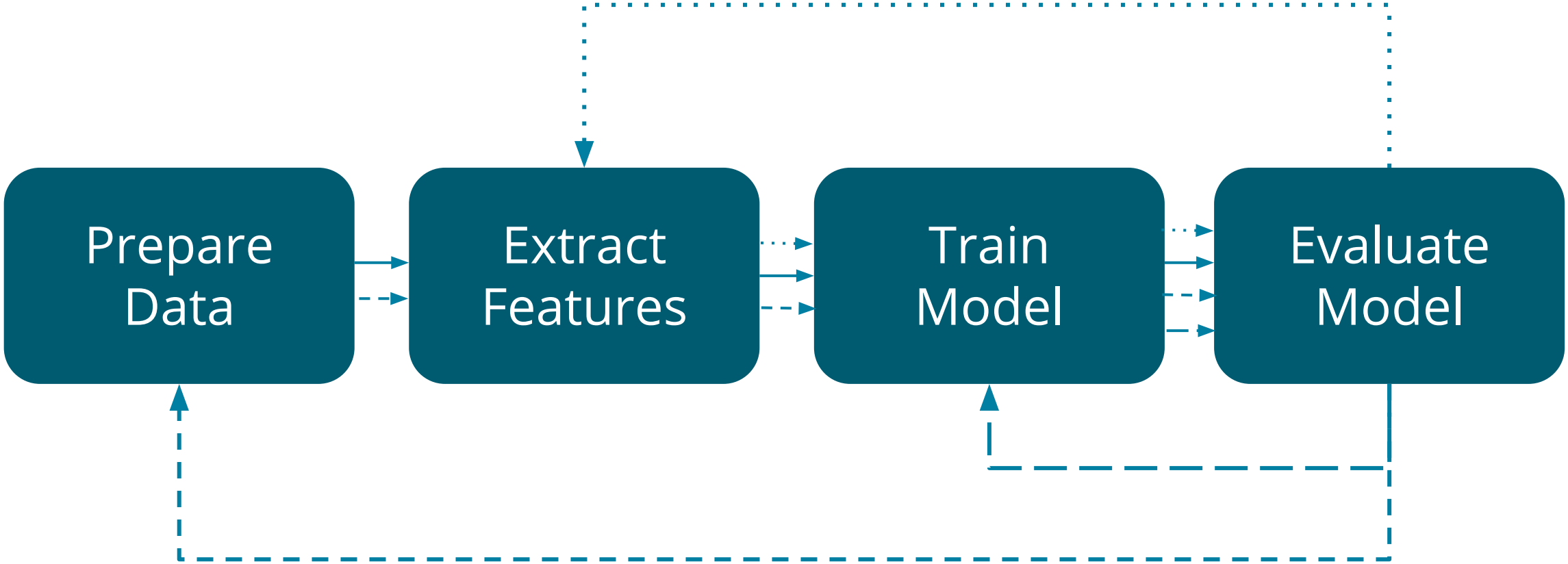
Exploratory Data Science team

Pearson

Intro

Iterative Machine Learning Process



Source: https://dvc.org

Challenges

Challenges

- Discrepancy between versions of source code and versions of data files
- Effect of hyperparameter changes
- Recovering old ML experiments
- Reproducibility
- Sharing large data files with other colleagues

Our goal

Given relatively big data, we want to seamlessly experiment with new ML approaches.

DVC comes into play!

DVC

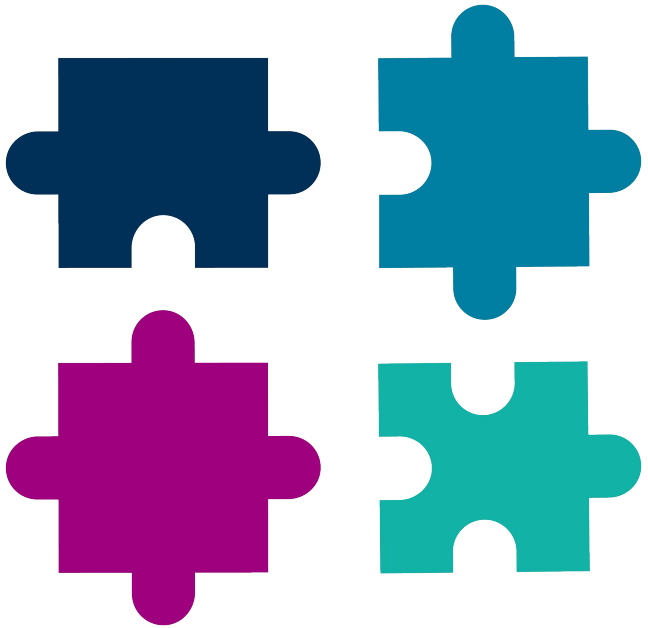
- DVC stands for **Data Version Control**.
- It's an **experiment management software** which works on top of Git repositories.
- DVC is a command-line tool.
- It supports all common OS: Mac OS, Linux and Windows.

DVC core features

- Building DAG pipelines which makes ML project reproducible
- Storing version of data files for each experiment
- Language agnostic
- Open-sourced
- Supporting cloud storage

DVC with Git

1. The master branch should store
   a stable version of our model.
2. Each experiment should be performed
   in a separate branch.
3. If experiment is successful, merge with master.



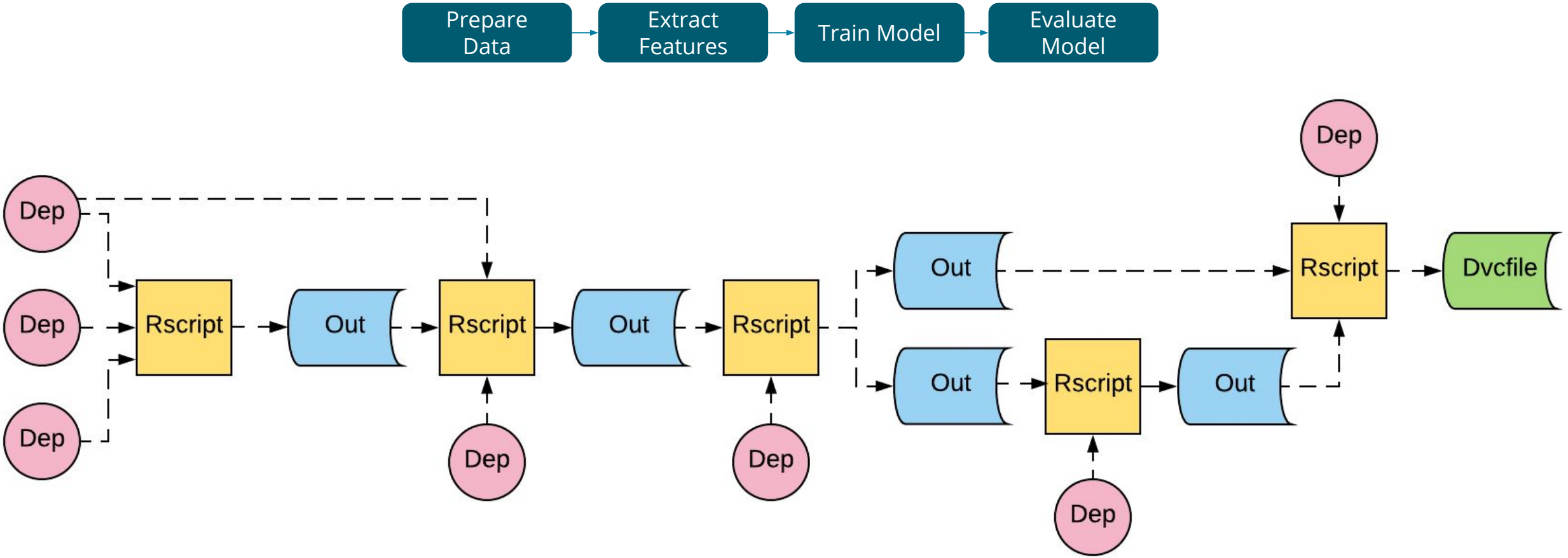
Walkthrough

How to start

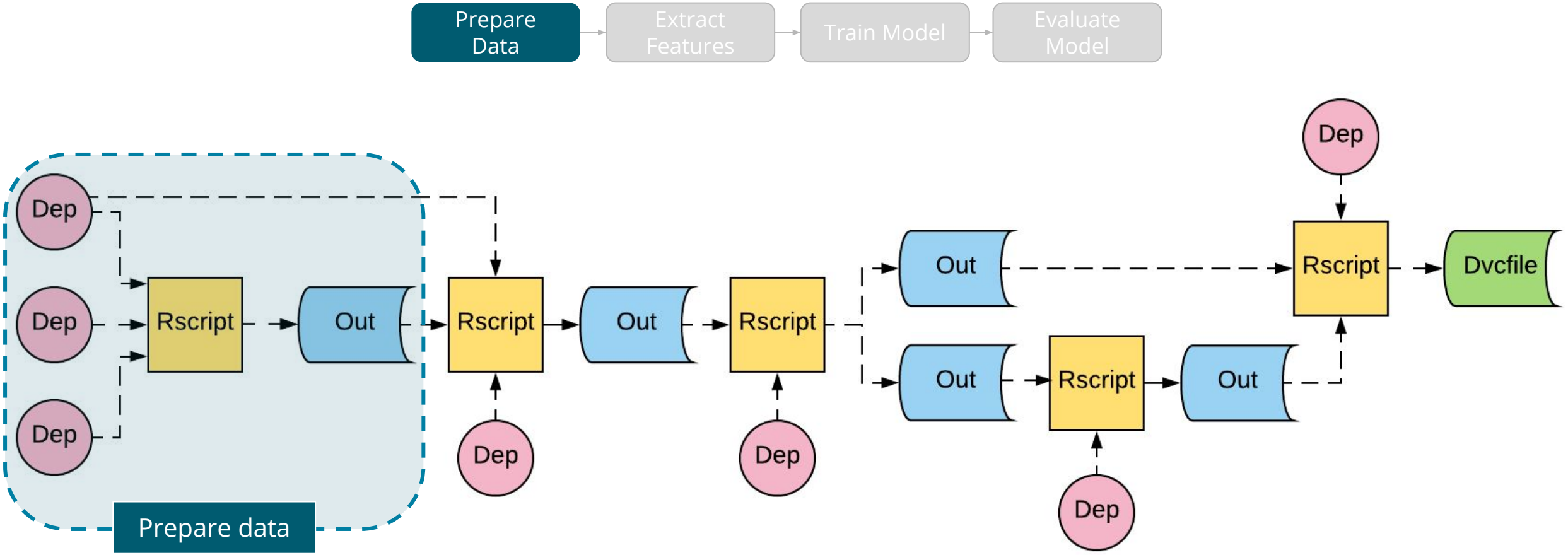
```
$ pip install dvc
$ git init
$ dvc init
$ ls .dvc
-> config
-> cache/
-> .gitignore
```

`cache/` directory will contain your data files. It is defined in `.gitignore`.

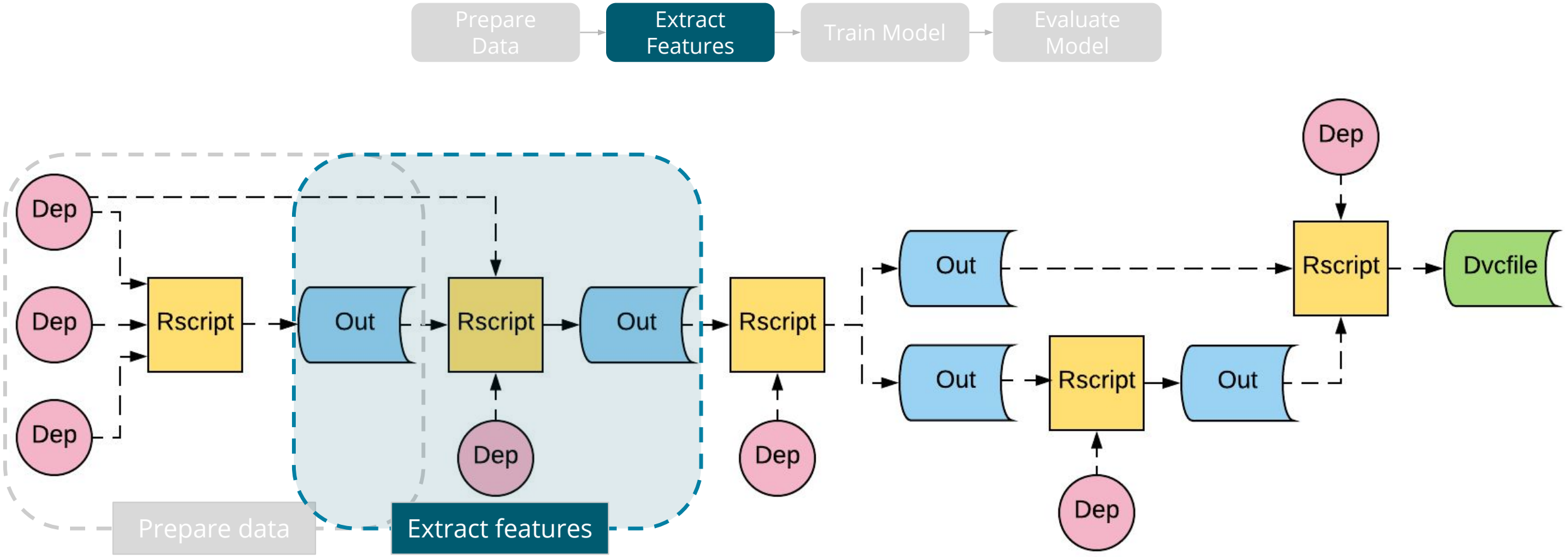
DVC pipeline



DVC pipeline



DVC pipeline



How to create a single task

`dvc run`

- Allows us to build lightweight DAG pipelines.
- It's important to define **dependencies** (-d), **outputs** (-o)

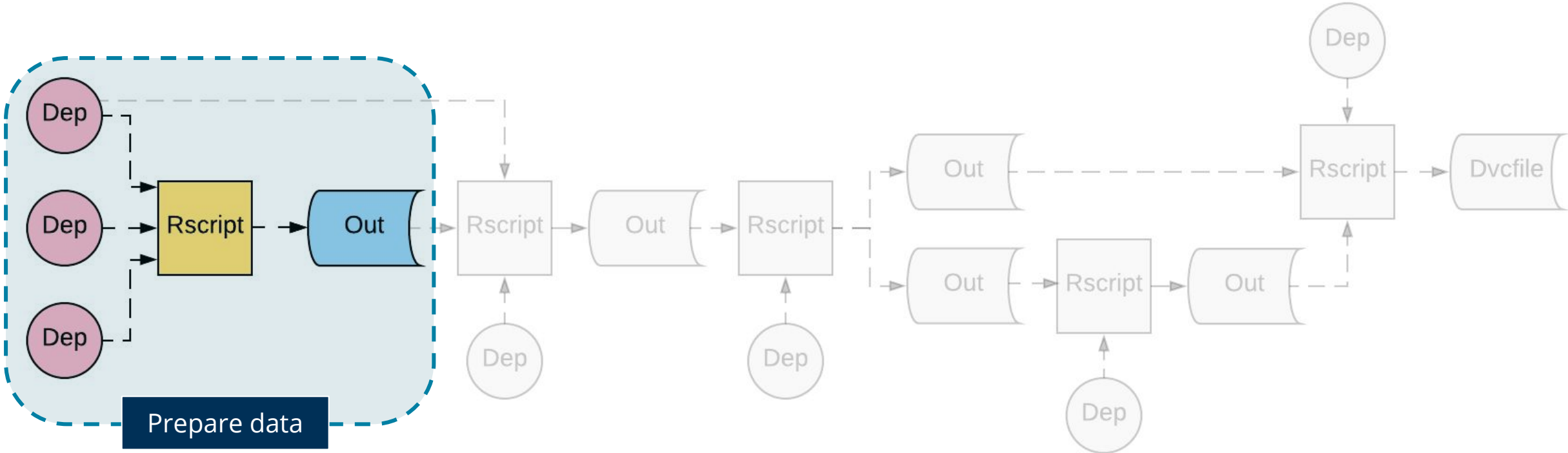
  and a **script** to execute.

```
$ dvc run -d data/titanic.csv -d code/conf.R -d code/data_preparation.R -o
data/clean_titanic.csv Rscript code/data_preparation.R
```

- Once we you run it, it creates `.dvc meta data` file which corresponds with `.dvc/cache` directory.

dvc run

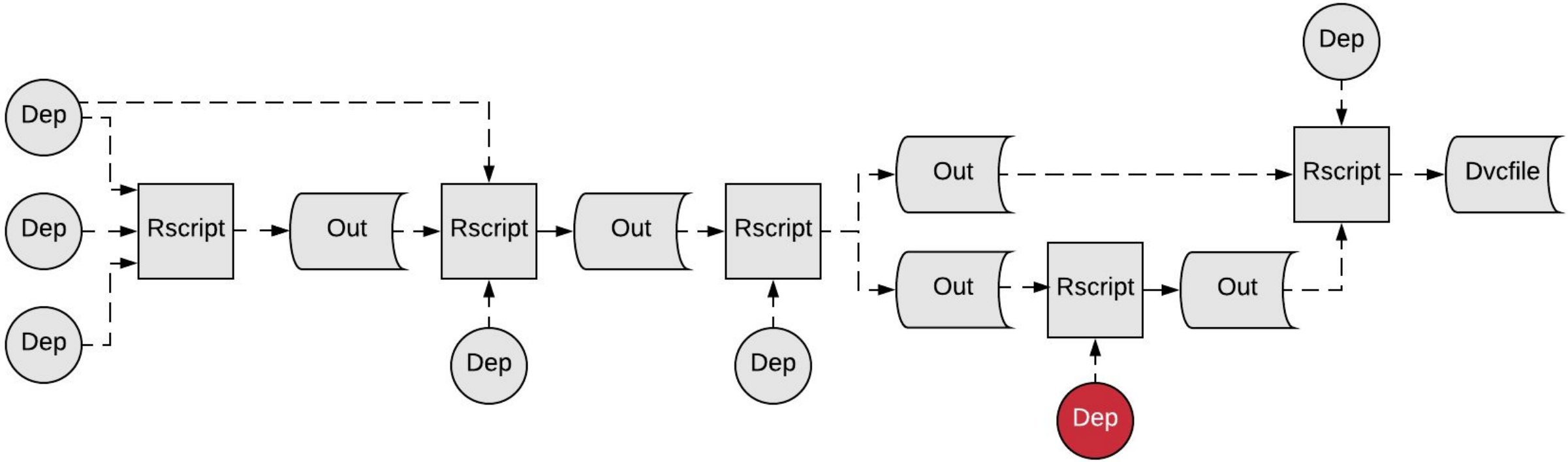
```
$ dvc run -d data/titanic.csv -d code/conf.R -d code/data_preparation.R
-o data/clean_titanic.csv Rscript code/data_preparation.R
```



`dvc repro`

- A command which allows to reproduce our DVC pipeline.
- It automatically **detects** only these tasks which **have to be reproduced**.

dvc repro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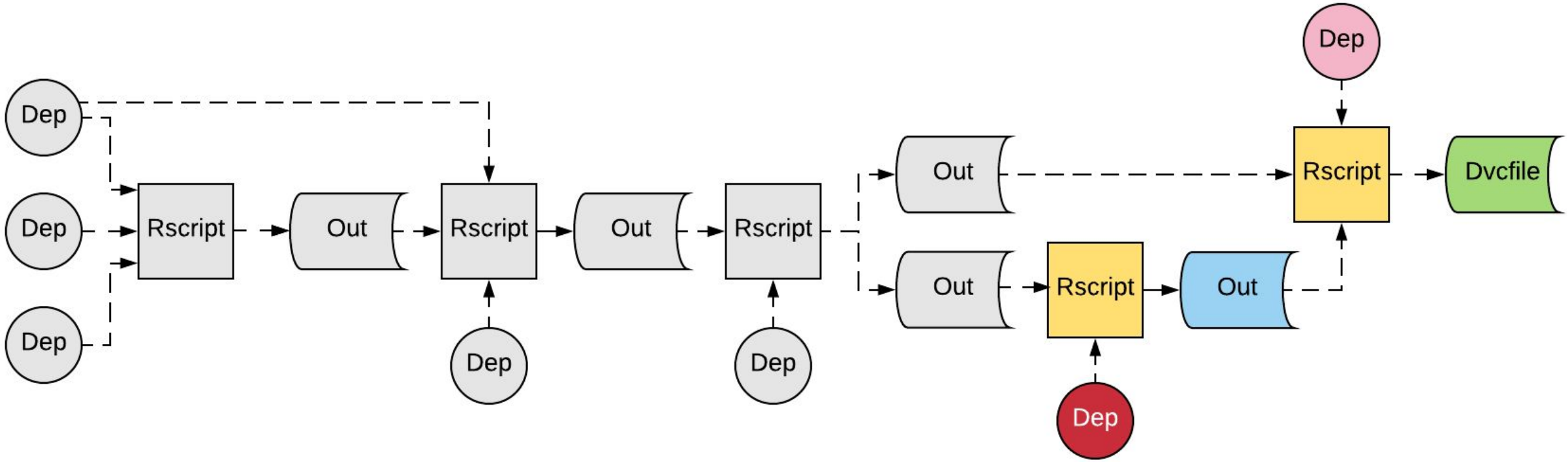
dvc repro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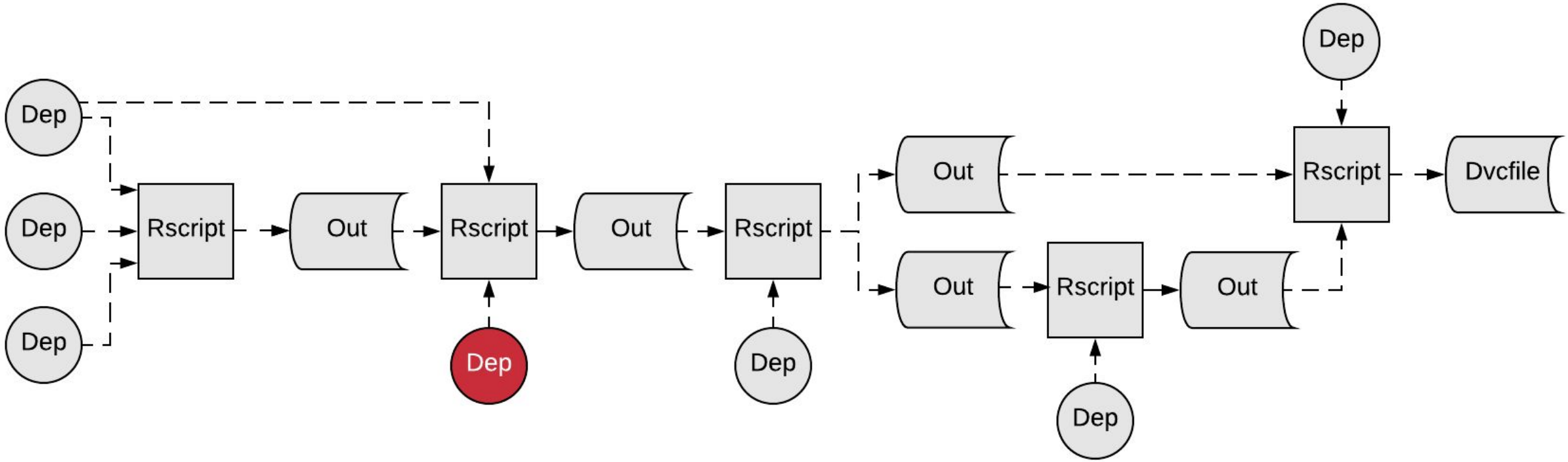
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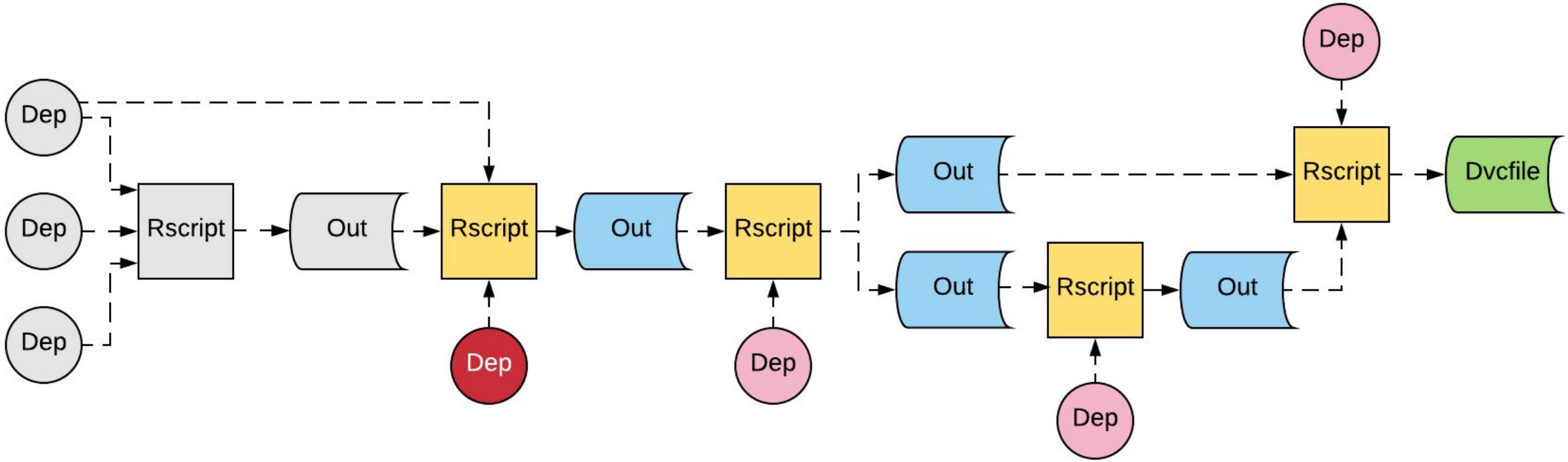
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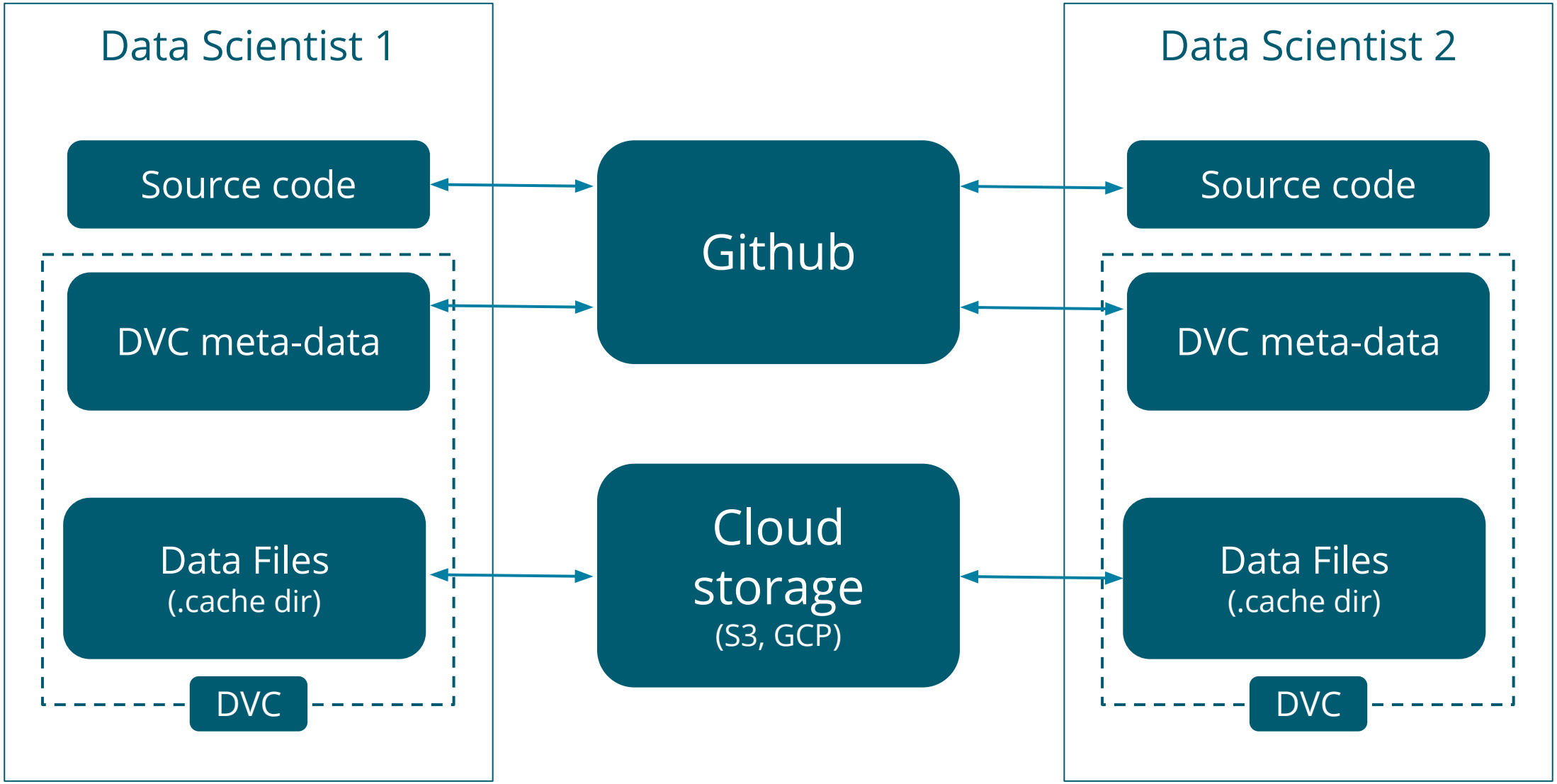
Team workflow



Source: https://dvc.org

Caveats

Keep in mind

- Rapid development of DVC
- DVC developers are very responsive - just create a github issue!

Useful links

- DVC homepage dvc.org
- Our team blog: ioki.pl/blog

ALWAYS LEARNING