



Introduction to cloud modeling

Exercise 1: software overview and installation

Numerical cloud models at the cloud microphysics group

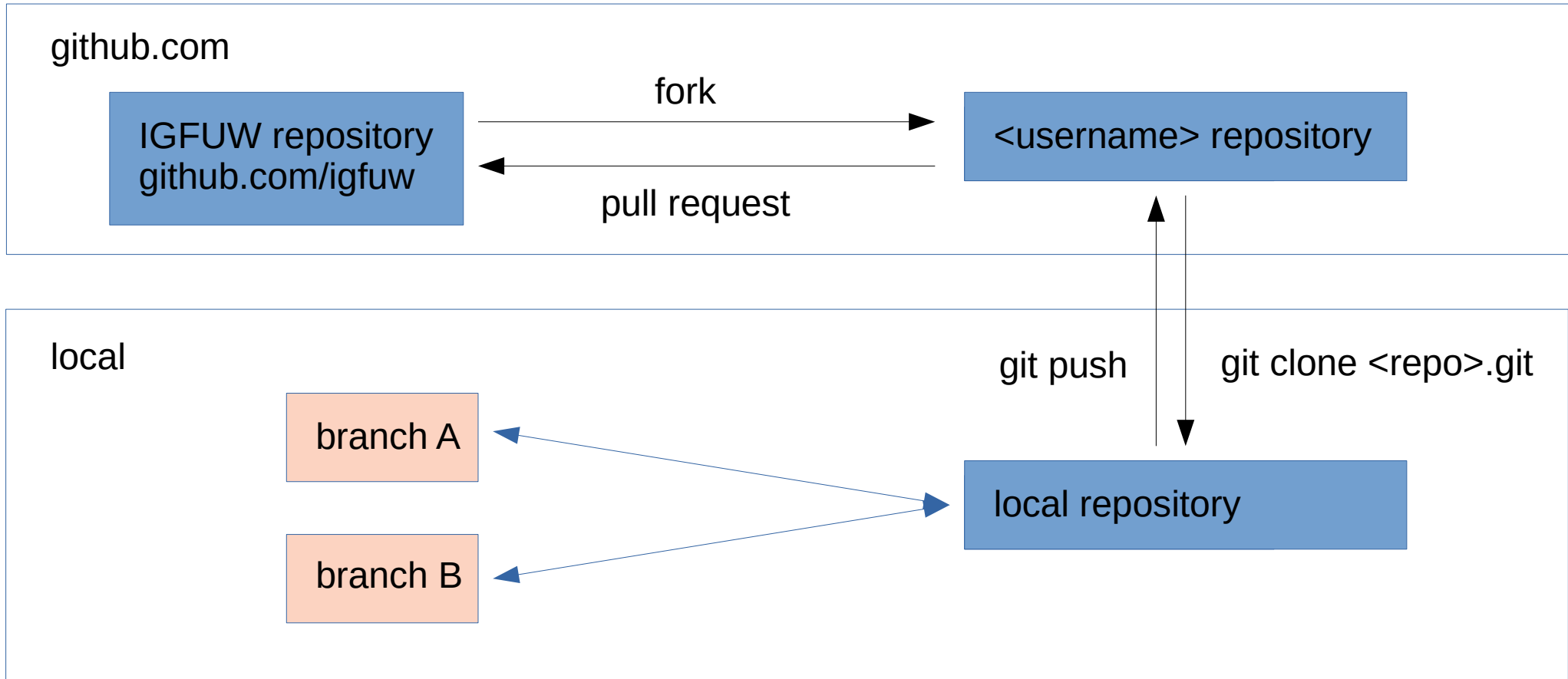
	0D	1D	2D	3D
kinematic	Parcel (Python)	KiD-A (Fortran)	Icicle (C++)	
dynamic			UWLCM (anelastic, C++)	UWLCM (anelastic, C++) dry PBL (Boussinesq, C++)

Open source: <https://github.com/igfuw>

Software libraries for cloud modeling

- libcloudph++
 - Lagrangian, Super-droplet
 - Single-moment bulk
 - Double-moment bulk
- libmpdata++
 - Eulerian advection with MPDATA
 - Pressure solver

Git workflow



TODO: get local copies of libcloudphxx, libmpdataxx, parcel.py and UWLCM

Dependency hell

- Boost
- Blitz++
- Thrust
- CUDA
- HDF5
- Python
- CMake
- NumPy
- Scipy
- MPI: problems²

Solution: containerization!

Singularity container (Anna Jaruga)

1) Install Singularity

2) Download UWLCM image:

```
$ singularity pull library://pdziekan/default/uwlcmlcm:v0.1d
```

3) Start a shell within the image:

```
$ singularity shell uwlcmlcm_v0.1.sif
```

4) The shell will have all required dependencies

Task: Build the code

- Following instructions in README (visible on the main github page of a project):
 - Build libcloudph++, run unit tests and install it
 - Run unit tests of libmpdata++ and install it
 - Build icicle, it is a part of libcloudph++ (libcloudph++/models/kinematic_2D)
 - Download and run unit tests of parcel
 - Build UWLCM and run unit tests (UWLCM/singularity/README_singularity.md)