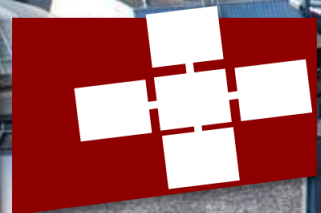


Alexandru Calotoiu

DaFIEx



To_GPU

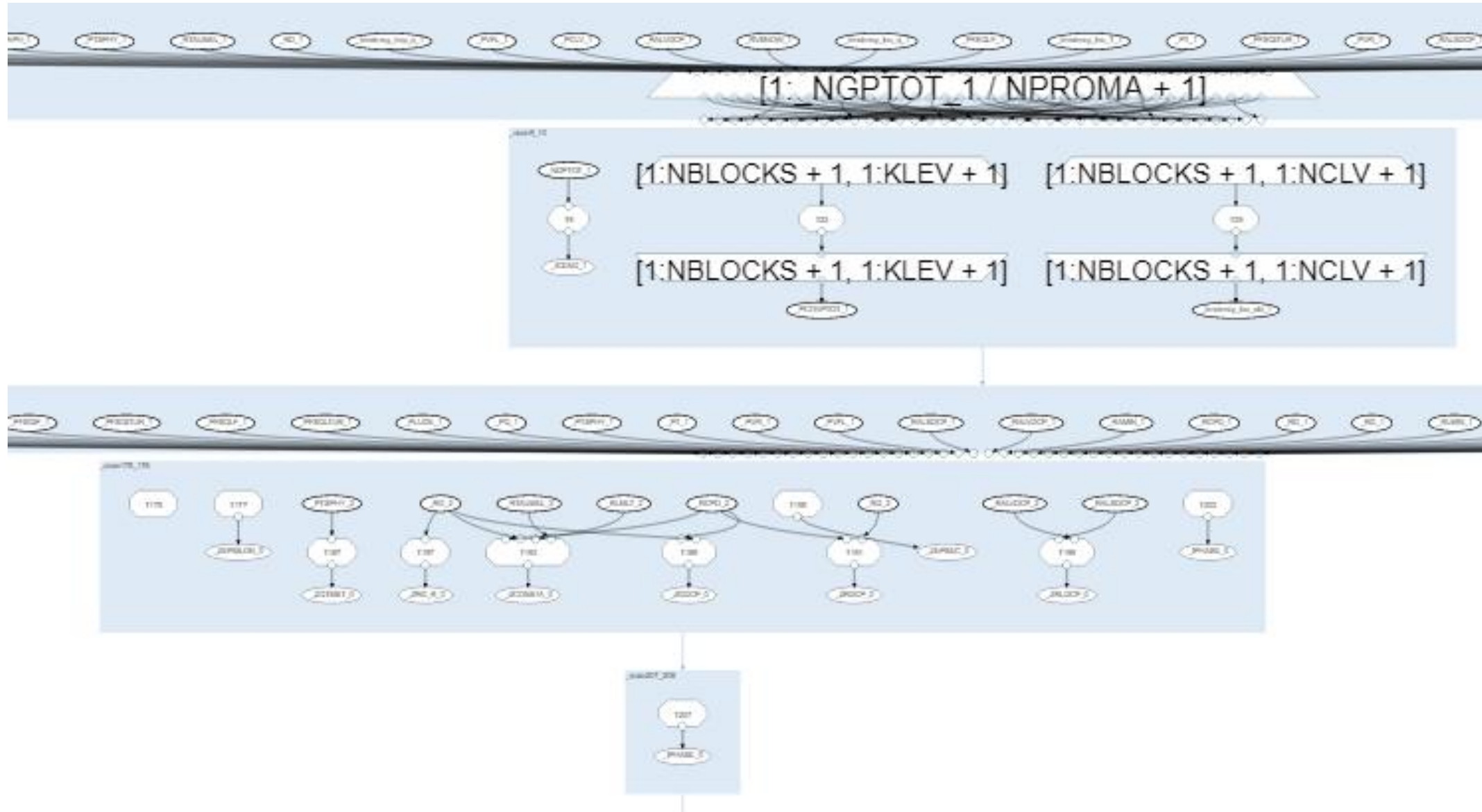
Existing implementation outdated

- Tested on smaller kernels
- Works well on small kernels
- Not suited for large applications

Research questions

- Which Maps to offload?
- What data to move?
- Should scalars or tasklets be moved?

Example



Correctness

Improve to_GPU to handle

- Nested SDFGs
- Scalars
- Single Tasklets

Additional requirements

- Map Fission
- Heuristic Map Fusion

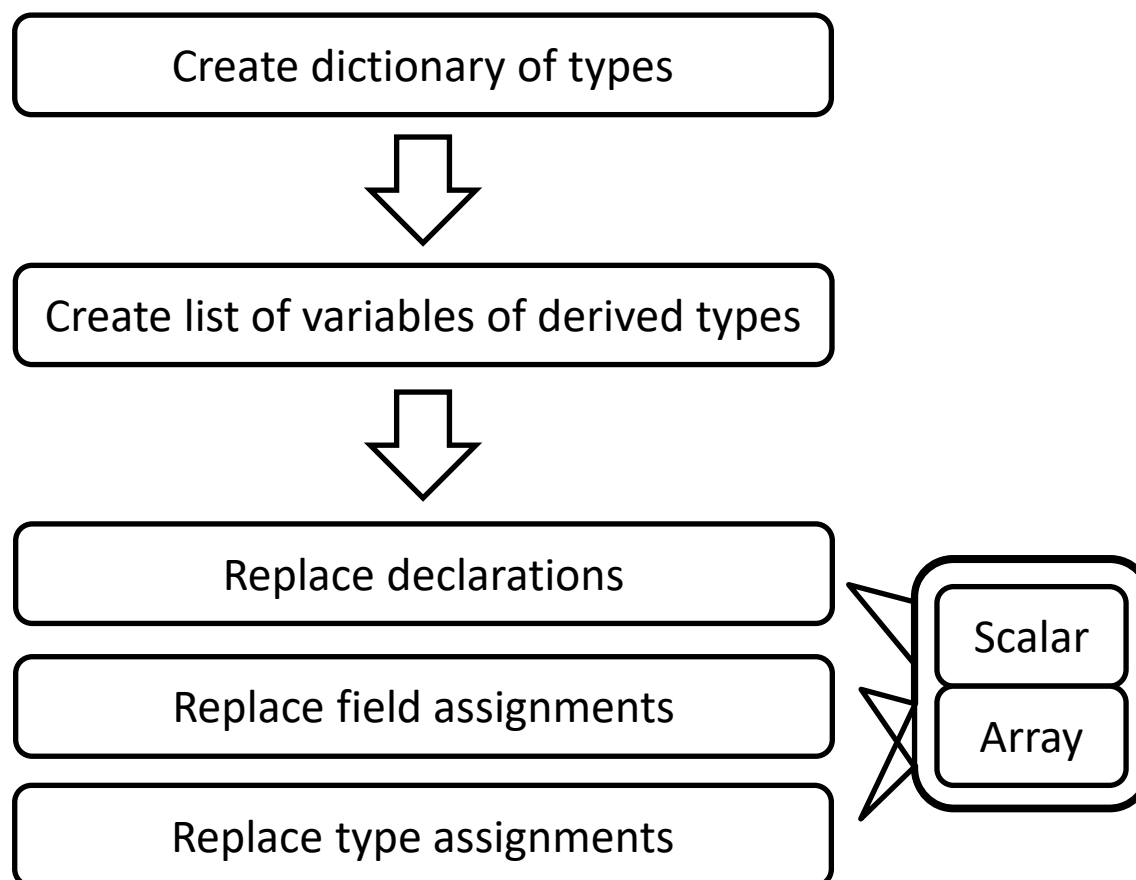
```
type state_type
  REAL, dimension(10,5) :: u,v,T
  REAL, dimension(10,5) :: o3,q,a
  REAL, dimension(10,5,3) :: cld
end type state_type
```

```
TYPE (STATE_TYPE) :: tendency_cm1(10)
TYPE (STATE_TYPE) :: tendency_tmp
TYPE (STATE_TYPE) :: tendency_loc
```

```
tendency_tmp%u(1,1)=2
```

```
tendency_cm1(3)%u(1,1)=1
```

```
tendency_loc=tendency_tmp
```



Order of transformations – type processing must be first

Multiple steps required – but collateral damage difficult

“All in one” transformation seems to work – testing in progress

Further challenges:

```
! Adjoint integration
CALL CLOUDSC2AD ( &
    & 1, ICEND, NPROMA, 1, NLEV, LDRAIN1D, &
    & PTSPHY,&
    ! trajectory
    & PAPH(:, :, IBL), PAP(:, :, IBL), &
    & PQ(:, :, IBL), ZQSAT(:, :), PT(:, :, IBL), &
    & PCLV(:, :, NCLDQL, IBL), PCLV(:, :, NCLDQI, IBL), &
    & PLUDE(:, :, IBL), PLU(:, :, IBL), PMFU(:, :, IBL), PMFD(:, :, IBL), &
```

```
! ZAPH... = PAPH(:, :, IBL)*0.01
! ZAP     = PAP(:, :, IBL)*0.01
! ZQ      = PQ(:, :, IBL)*0.01
! ZZQSAT  = ZQSAT      *0.01
! ZT      = PT(:, :, IBL)*0.01
! ZL      = PCLV(:, :, NCLDQL, IBL)*0.01
! ZI      = PCLV(:, :, NCLDQI, IBL)*0.01
! ZLUDE   = PLUDE(:, :, IBL)*0.01
! ZLU     = PLU(:, :, IBL)*0.01
! ZMFU    = PMFU(:, :, IBL)*0.01
! ZMFD    = PMFD(:, :, IBL)*0.01
```