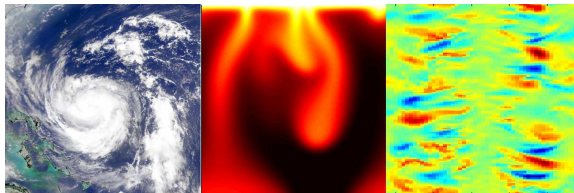


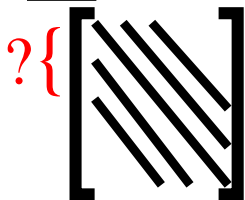
GeAccKL

Geoscience Accelerated Kernels Library

Common building blocks (waves, diffusion/advection, ...)



But: architecture and algorithm heterogeneity



⇒ Metaprogramming

GSFC

GeAccKL Structure File Converter

Basic Operations

e.g. multiplication



Processes

e.g. CG



Code

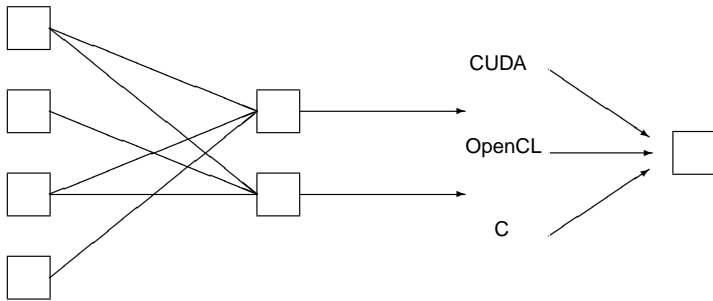
CUDA

OpenCL

C

Dynamically

linked library



Process gsf

GeAccKL Structure File (gsf) for process defines sequence of operations

```
PROCESS cg(A[in], b[in], x[out]):
```

```
    double alpha, r, p;
```

```
    CALLOP residual(r, B, A, x)
```

```
    CALLOP memcopy(p, r)
```

```
    CALLOP dotprod(alpha, r, r)
```

```
    . . .
```

```
END
```

Operation gsf

Generate code for operation based on configuration parameters

```
CASE $A.form[1] == 2 and $B.form[1] = 2:  
  % $A.size[1] == $B.size[0]  
  LV p int  
  DOMAIN 0,$C.size[1] 0,$C.size[0] 0,0  
  for ($p = 0; $p < $A.size[1]; $p++)  
  {  
    $C[$j, $i] = $A[$j, $p] * $B[$p, $j];  
  }  
END
```