CERSe
Component-based Environment for Remote Sensing
Work in Progress

Nathan DeBardeleben
William Jones
W. B. Ligon III
Parallel Architecture Research Laboratory (PARL)
Clemson University, Clemson, South Carolina
http://www.parl.clemson.edu/

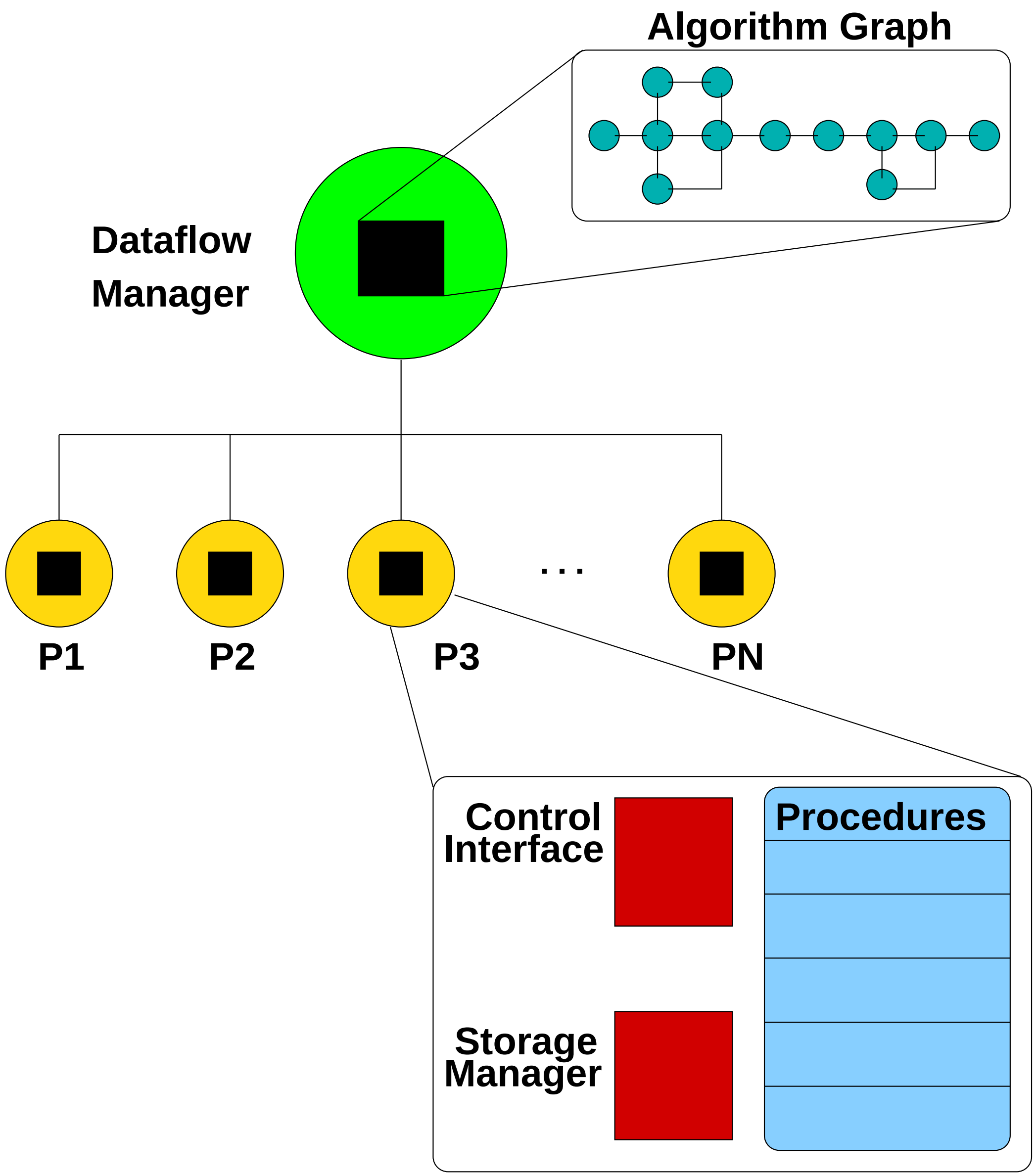
Motivation

- NASA, remote sensing, and earth science
- Projected rate: 1-2 terabytes of data per day
- Regional Application Center
- Need for parallel computing:
  - Low cost philosophy of the RAC
  - Beowulf systems
- Software development problems:
  - Code reuse
  - Fast development
  - Production performance

Approach

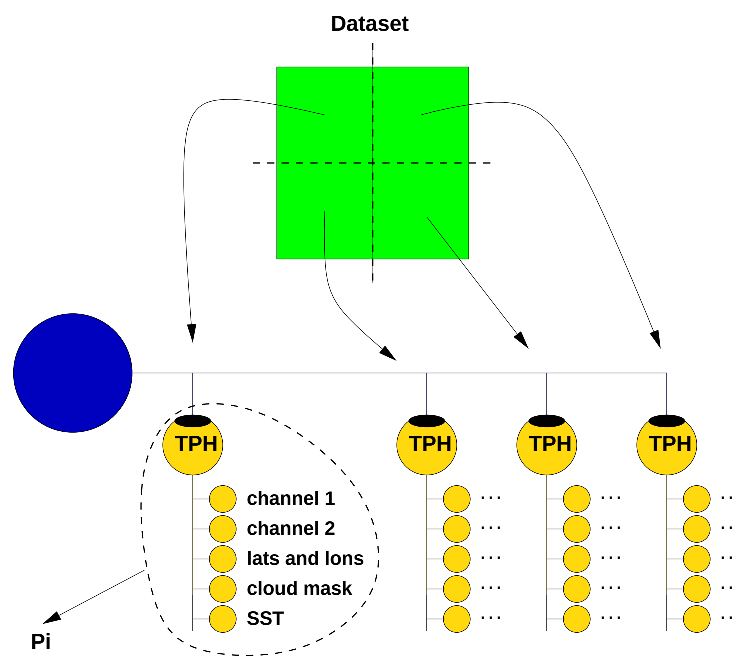
- Plug compatible modules
- Dataflow Manager handles:
  - Data partitioning
  - Memory allocation
  - Data distribution
  - I/O
  - Routing
- Take advantage of parallelism here

CERSe Graphically



Data Representation

- Not simple data types
- Tagged Partition Handle
- Planning and automatic planning
- Garbage collection



Completed Work

- About 40 components for navigation, calibration, georectification, and common RS algorithms
- 8 map projections
- Hand-coded CERSe programs
- Parallel processing and parallel I/O
- Graphical interface to design algorithms and evaluate performance

Future Work

- Language-based representation
- Translation of graphical representation into language representation
- More components

Conclusion

- Not just prototyping of algorithms
  - Production performance:
    - Parallelism
    - Memory management
    - High performance I/O
    - Fault tolerance (?)
  - Interactive development
- Component-based architecture
- http://webwulf.parl.clemson.edu