

Introduction to NumPy

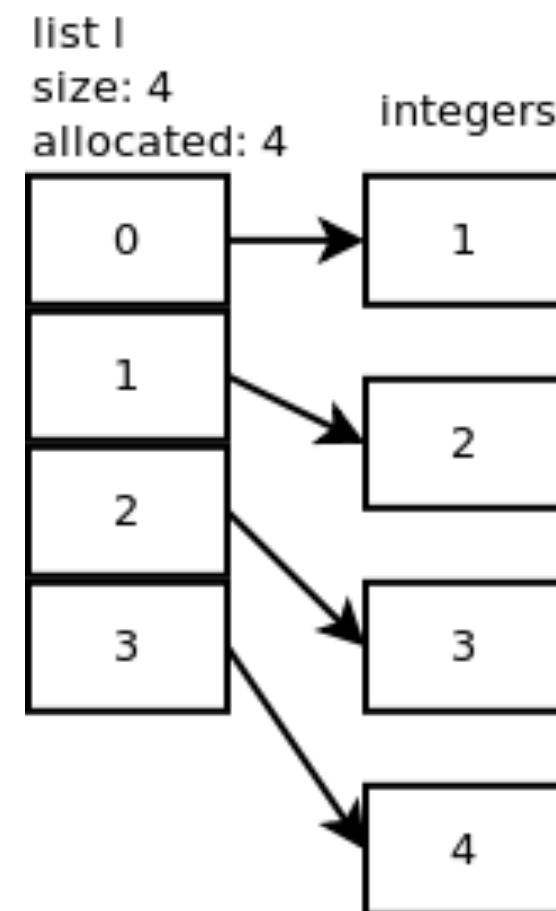
The basic building block of every numerical application

Why NumPy?

- Numerical applications normally need a way to keep data in as dense way as possible
- This is because of 2 reasons:
 - Need to store large amounts of data
 - Need to operate quickly with them

A list in Python

- Implemented as an array of pointers
- Needs to store both the value and the pointer to the value
- Flexible for insertions and appends, but not efficient in terms of memory



An array in Python

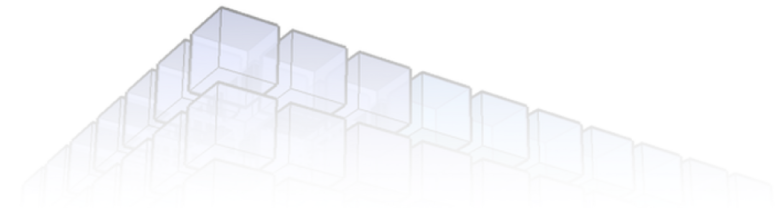
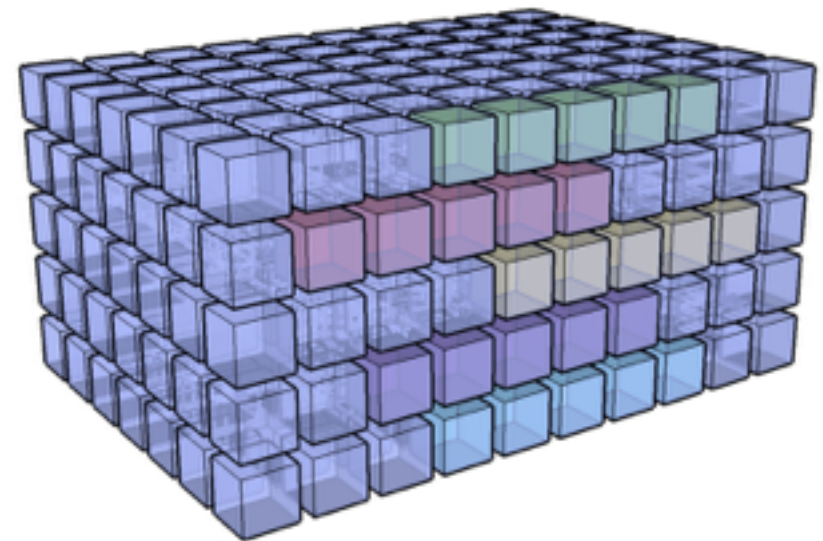
(import array)

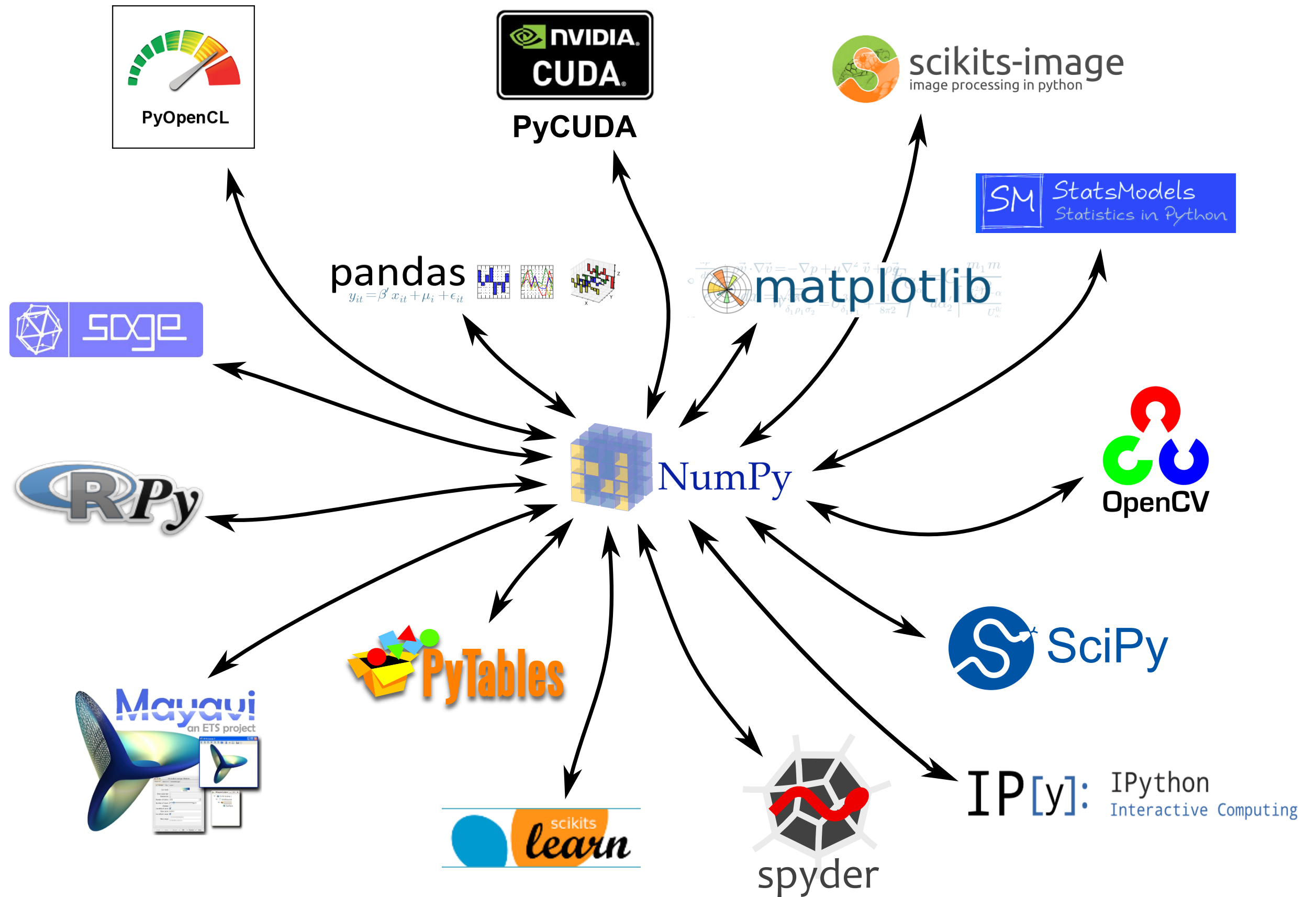
- All the values are stored together in memory: efficiency!
- Not powerful enough:
 - Only one dimensional
 - No struct types
 - Limited operation

1.2
2.3
0.4
0.5
0.1

Enter NumPy!

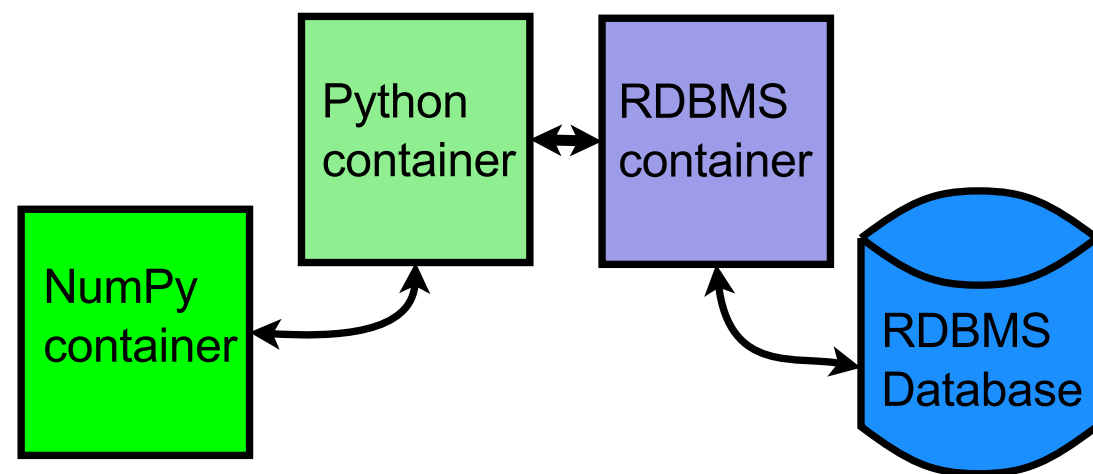
- Data is stored sequentially too
- But:
 - N-dim arrays
 - Struct types
 - Powerful weaponry for data handling





NumPy as direct buffer for disk I/O

Very inefficient data access



Efficient data access

