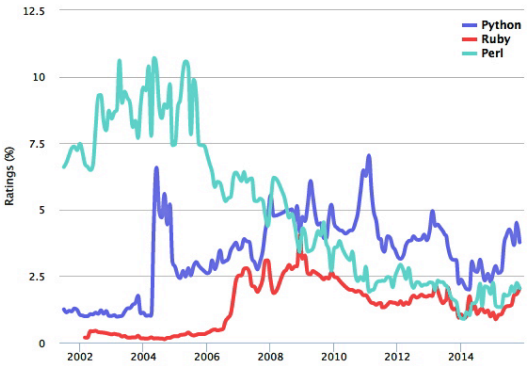
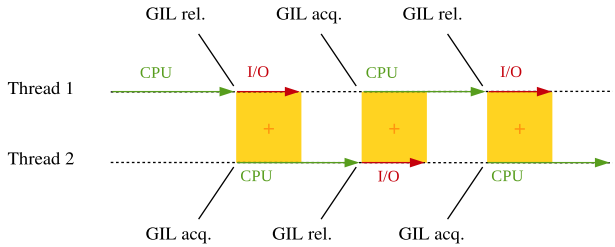
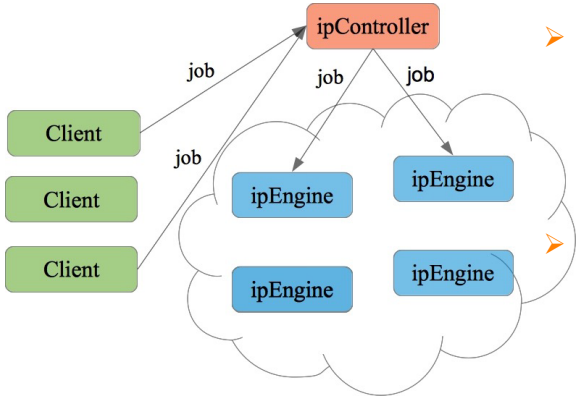
Python code parallelization for ALMA - Challenges and alternatives - (P6-11)



- Python is nowadays the main scripting language, specially in the Astronomy community.



- Python Multithreading is not suitable due to the global interpreter lock (GIL).



- iPython MultiEngine processing framework was promising but backwards compatibility is not guaranteed (e.g. v0.23).
- **MPI (Message Passing Interface) offers a long-term stable API (more than 25y)** founded by EU and US sustained programmes.

	pypar	mpi4py	myMPI	pyMPI	Scientific MPI
Pre allocated buffer for send-recv	✓	✓	✘	✘	✓
Explicit MPI_Initialize	✘	✓	✓	✘	✘
Explicit Communicator	✘	✓	✓	✘	✓
Interactively parallel run	✘	✓	✘	✓	✓
Arbitrary Python object	✓	✓	✘	✓	✘
Latency (micro seconds)	25	14	33	133	23
Bandwidth (Mbytes / seconds)	899	944	364	151	509

- **mpi4py provides** highly efficient MPI bindings for Python , supporting **interactive mode and communication of arbitrary python objects** w/o requiring explicit serialization.