

# Use of Python as a MATLAB Replacement for Algorithm Development and Execution in a Multi-Core Environment

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# Requirements



- 
- Signals Intelligence algorithm development
  - Non-cooperative energy detection
  - Large data sets (1/2 terabyte)
  - Signal processing operations
  - Need to implement algorithms quickly yet be able to run them on large data sets
  - Distribute over a large number of nodes



# Approach



- 
- Python: a powerful scripting language
  - Numpy: numerical arrays for Python
  - Matplotlib: MATLAB-like plotting facilities
  - IPython1:
    - High-level parallel/distributed computing in Python
    - Supports many styles of parallelism
    - Fully asynchronous model with asynchronous exception propagation over the network



# Results



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- Input I/O bottleneck addressed using NFS
  - Output I/O logs to database but also returns intermediate results to client
  - Wideband recordings processed on 10-dual-dual Xeon blades (40 cores)
  - 2,653 lines of code
  - Up to 30x speedup