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Use cases for Python in Eclipse for HPC

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Agenda

- Introduction to python

- Pydev: python in Eclipse

- HPC python installations

- Pydev-PTP use cases

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Introduction to python

- Python: interpreted, interactive, object-oriented, extensible programming language

- Similar in nature to scheme, ruby, perl or tcl

- Used as a scripting tool

- Used for general-purpose programming (e.g., web programming)

- Used for high-performance numeric computing

www.python.org

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Pydev: python for eclipse

- Python IDE for Eclipse, supporting multiple python interpreters

- Language niceties: code completion, syntax highlighting, code analysis, etc.

- Runtime configuration: selection of interpreter, libraries

pydev.org

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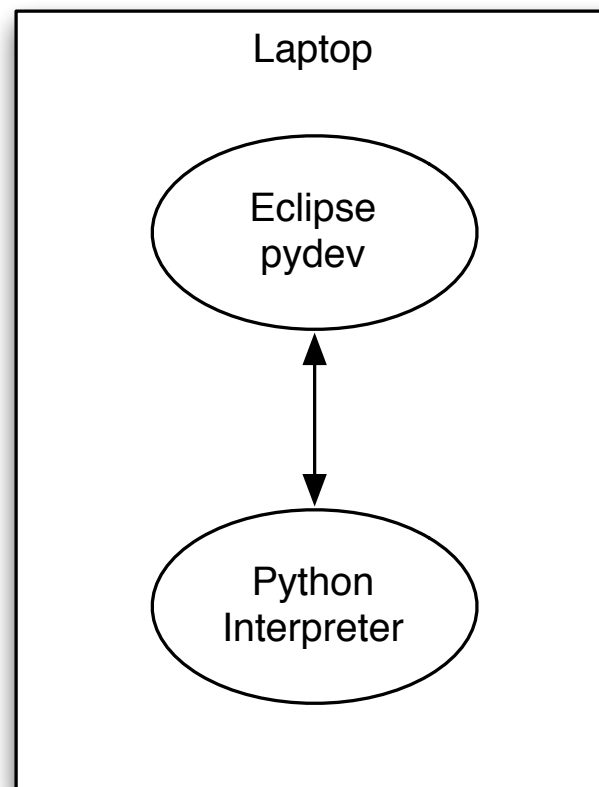
Pydev: Interactive console

- Interactive console
  - Create a python process connected to your eclipse session
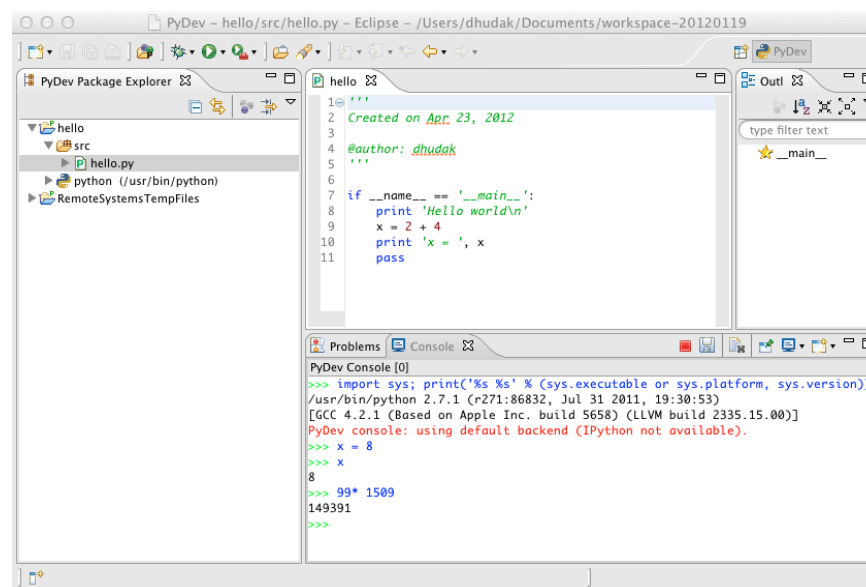
Python for HPC

- HPC challenges
  - Numeric performance: libraries and compilation
  - Distributed programming

- Libraries
  - numPy – wrappers around LAPACK
  - sciPy – scientific functions
  - many others

- Compilation – write code in C, call it from Python

- Distributed programming
  - SPMD programming with MPI, GA

- iPython – python shell
  - Similar to MATLAB
  - Some support in pydev
  - Has multiprocess control (stay tuned)

www.scipy.org/PerformancePython
Ipython.org enthought.com

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Pydev-PTP use case #1

- Support existing pydev functionality for interpreter on remote system
  - Goal: user does not have to create python interpreter

- Not sure, pydev may now do this

- I currently do with with RSE (remote editor, terminal)

Laptop		Login or Cluster Node
Eclipse pydev PTP?	→	Python Interpreter
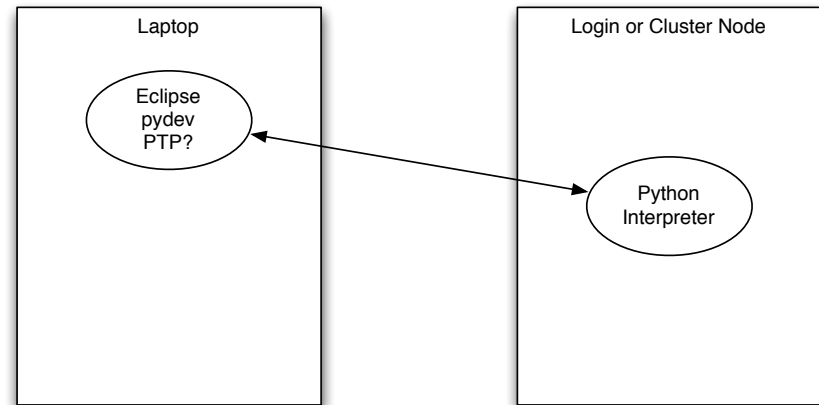
Pydev-PTP use case #2

- HPC python installation on cluster

- User writes Python code with MPI

- Submits jobs and checks results through PTP

Laptop	Login Node
Eclipse pydev PTP	Batch Manager
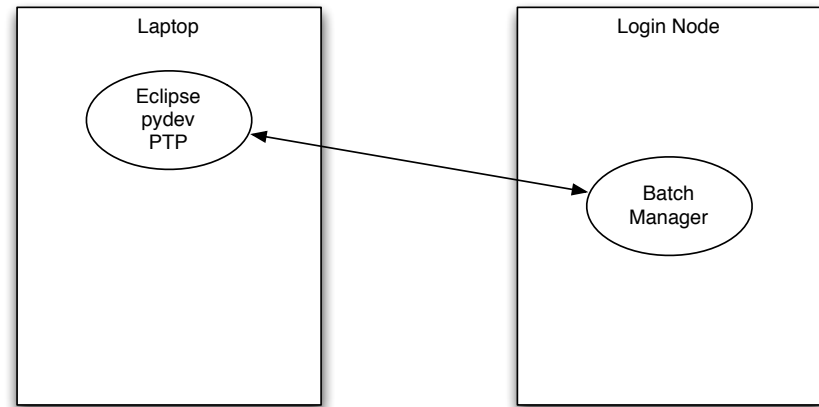
Pydev-PTP use case #3

- Interactive parallel computing with iPython

- iPython engines
  - communicate with controller via zeroMQ
  - communicate with each other though MPI

- Use case similar to MATLAB Distributed Computing Server (DCS)

Laptop

Eclipse pydev PTP

Login Node

iPython Shell

iPython Controller

iPython Engine

iPython Engine

iPython Engine

iPython Engine

Cluster Nodes

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