Python programming for real-world constraints

dark arts to envision execution and make systems run faster

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Real-world constraints

- Understand code better
- Identify bottlenecks
- Work around bottlenecks

5.5y at Facebook

Made over 10k cache servers

fast, stable, and available

Consultant

Co-founded Ajah.ca

Fellow of the PSF

Started Montréal-Python

Vice-chairman, PyCon 2012-13

Real-world constraints

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Introspection

- Ipython / Jupyter notebook
- ?, ??
- pprint()
- inspect

Debugging

- Avoid print()
- pdb, ipdb
- set_trace()
- pysnooper

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Scarce resources

- CPU
- Memory
- I/O: disk & network

Access hierarchy

- CPU cache
- RAM, local network
- Hard drive
- Internet

Profiling

- time, timeit, sys.getsizeof()
- cProfile
- kcachegrind, WinCacheGrind
- memory_profiler
- scalene

Resource monitoring

- top
- iotop, iostat
- jnettop

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Mitigation Strategies

- I/O: Threading, asyncio
- CPU: Cython

Libraries and tools

Ipython	cProfile	cython
pprint	kcachegrind	top
inspect	memory_profiler	iotop
timeit	scalene	iostat
pysnooper	asyncio	jnettop

Credits