LyPyMeetup, 2019-04-24

Serverless Jupyter

github.com/drola Matjaž Drolc

Visa aktiva kartlager

Foto (Obs! datumet är ungefärligt)

Visar: Senaste mätdata **Foto från:** 2018-06-03

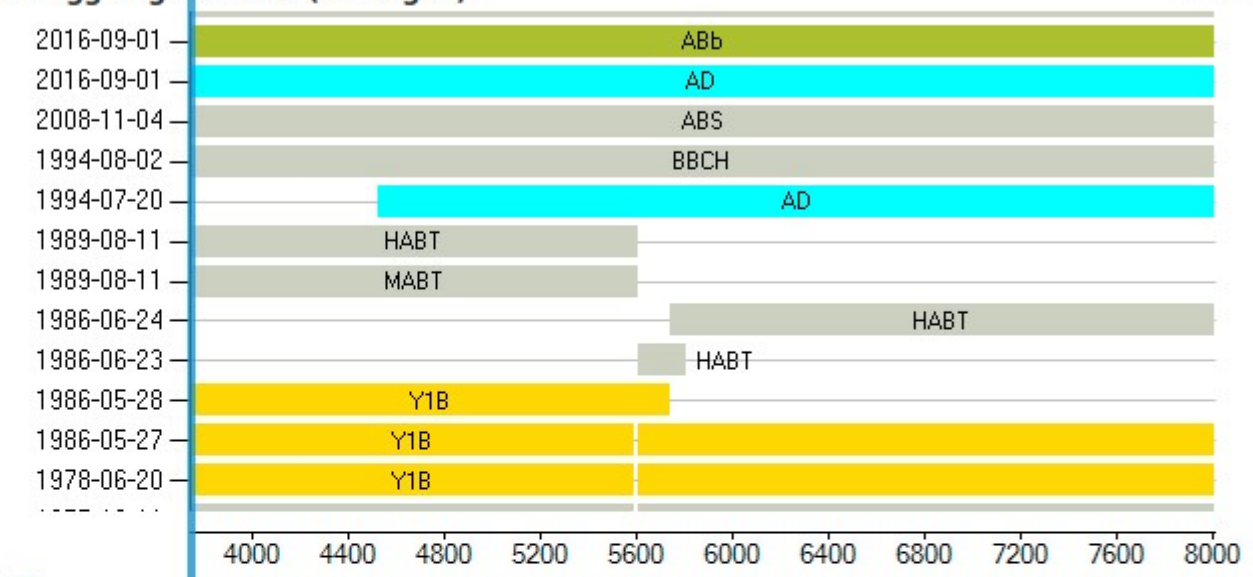
Nytt fönster

Google Street View

Tvärprofil

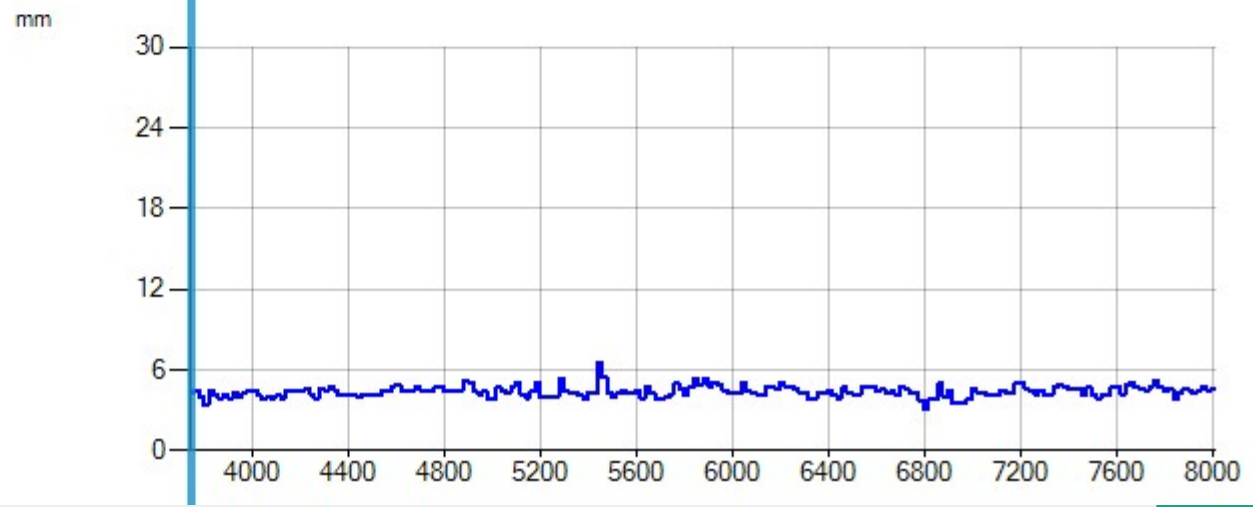
Löpande längd : 3 740

Beläggningshistorik (homogen)



Skriv ut text för beläggningslager * = Det finns garantiuppgifter för åtgärd. ** = Garantiuppgifterna gäller för totalentreprenad

Spårdjup max17 (20m) | **Visar:** Senaste mätdata



- Example Jupyter notebook

  https://nbviewer.jupyter.org/github/rlabbe/Kalman-and-Bayesian-Filters-in-Python/blob/master/02-Discrete-Bayes.ipynb

- Collection of other notebooks

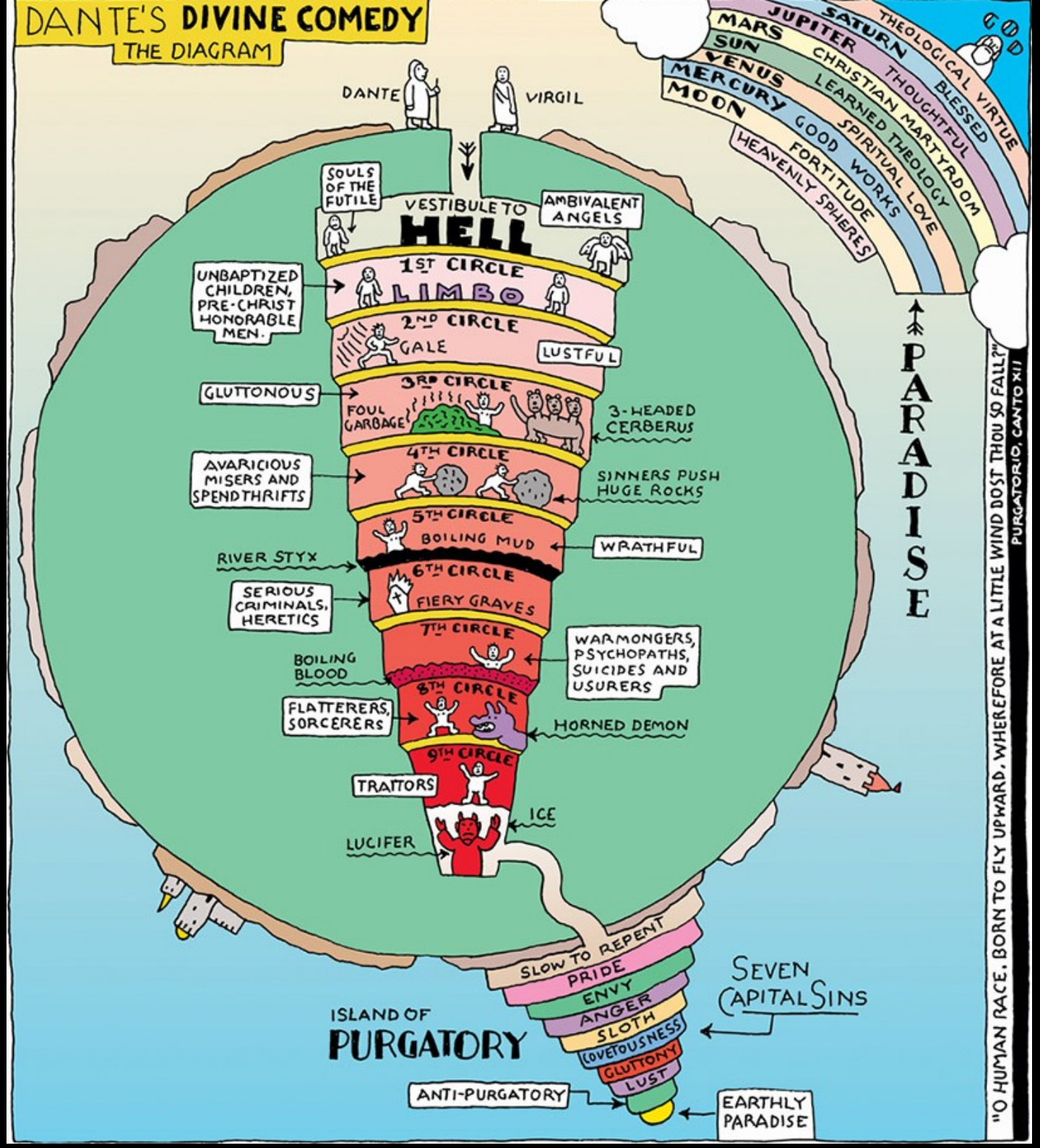
  https://github.com/jupyter/jupyter/wiki/A-gallery-of-interesting-Jupyter-Notebooks

Development process

1) Prototype in Jupyter
2) Integrate into our product: backend and frontend
3) Repeat

Python in browser

- Transpiler (Python to JS)
  - https://transcrypt.org/
- Interpreters
  - https://brython.info/
  - http://www.skulpt.org/

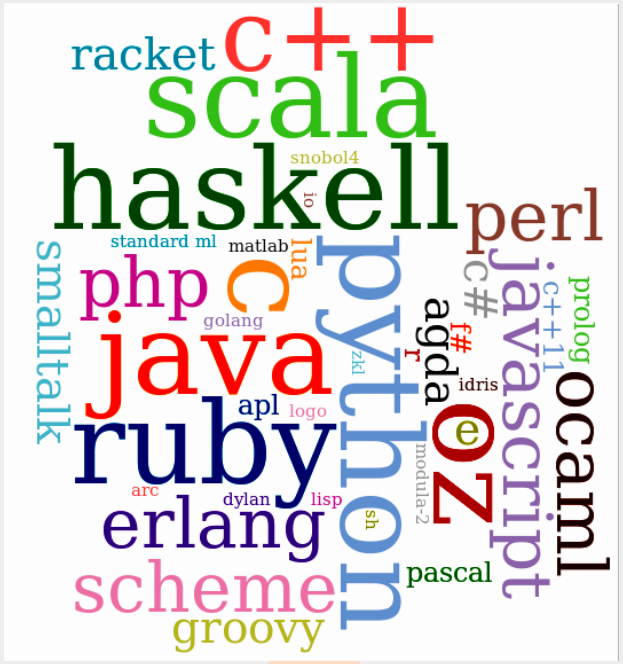

DANTE'S DIVINE COMEDY
THE DIAGRAM
DANTE
VIRGIL
GOD
THEOLOGICAL VIRTUE
SATURN
BLESSED
JUPITER
THOUGHTFUL
MARS
CHRISTIAN MARTYRDOM
SUN
LEARNED THEOLOGY
VENUS
SPIRITUAL LOVE
MERCURY
GOOD WORKS
MOON
FORTITUDE
HEAVENLY SPHERES
SOULS OF THE FUTILE
VESTIBULE TO
HELL
AMBIVALENT ANGELS
1ST CIRCLE
LIMBO
UNBAPTIZED CHILDREN, PRE-CHRIST HONORABLE MEN.
2ND CIRCLE
GALE
LUSTFUL
3RD CIRCLE
GLUTTONOUS
FOUL GARBAGE
3-HEADED CERBERUS
4TH CIRCLE
AVARICIOUS MISERS AND SPENDTHRIFTS
SINNERS PUSH HUGE ROCKS
5TH CIRCLE
BOILING MUD
WRATHFUL
RIVER STYX
6TH CIRCLE
SERIOUS CRIMINALS, HERETICS
FIERY GRAVES
7TH CIRCLE
WARMONGERS, PSYCHOPATHS, SUICIDES AND USURERS
BOILING BLOOD
8TH CIRCLE
FLATTERERS, SORCERERS
HORNED DEMON
9TH CIRCLE
TRAITORS
ICE
LUCIFER
PARADISE
"O HUMAN RACE, BORN TO FLY UPWARD, WHEREFORE AT A LITTLE WIND DOST THOU SO FALL?"
PURGATORIO, CANTO XII
SLOW TO REPENT
PRIDE
ENVY
ANGER
SLOTH
COVETOUSNESS
GLUTTONY
LUST
SEVEN CAPITAL SINS
ISLAND OF
PURGATORY
ANTI-PURGATORY
EARTHLY PARADISE

Python in browser

- Worst option: manually rewrite to JS
  - Risk of mistakes
  - No good numpy, Pandas alternative
  - Problems with data types
  - Ongoing cost of maintaining two implementations

WebAssembly

- A binary instruction format
- High level language → compiler → WASM
- On clients and servers
- From 2017: Chrome, MS Edge, Firefox, Safari



Compiler

JavaScript

WebAssembly

Web browser

https://mbebenita.github.io/WasmExplorer

Python in browser

- Official Python interpreter is written in C
- So are Numpy, Scipy and Pandas
- Pyodide

  https://github.com/iodide-project/pyodide
- Python 3.7, Numpy, Pandas, Matplotlib

  https://github.com/iodide-project/pyodide/tree/master/packages

Jupyter
http://localhost:8888

Pyodide
https://alpha.iodide.io/notebooks/300

Pyodide API

https://github.com/iodide-project/pyodide/blob/master/docs/api_reference.md

Pyodide advantages

- Easy to host
- Server doesn’t need to handle computations
- Security and client isolation by design
- Running inside browser sandbox
- Decently fast. 1-12x slowdown compared to regular Python

Performance

- One of key goals for WebAssembly
- Video effects https://d2jta7o2zej4pf.cloudfront.net/
- WebM video codec https://github.com/GoogleChromeLabs/webm-wasm
- Gaming: Unreal Engine and Unity both support WASM https://s3.amazonaws.com/mozilla-games/ZenGarden/EpicZenGarden.html

Challenges

- Running in browser’s sandbox
  - Limited access to network and files
  - Networking limited to HTTP(S) and WebSockets
- Python+scientific stack takes ~50MB of space (partially mitigated by browser cache)
- “import threading” doesn’t work yet

Useful resources

- https://wasi.dev/ WASM System Interface
- https://wasmer.io/ Universal WASM runtime
- https://github.com/mohanson/pywasm Run WebAssembly inside Python

Future

- New interactive web applications for data exploration and education https://alpha.iodide.io/
- Richer documentation for Python and programming languages with inline demos
- Transition of multimedia editors, CAD, scientific computation to web browsers

Questions?

github.com/drola Matjaž Drolc

References

https://hacks.mozilla.org/2019/04/pyodide-bringing-the-scientific-python-stack-to-the-browser/

https://github.com/takenobu-hs/WebAssembly-illustrated