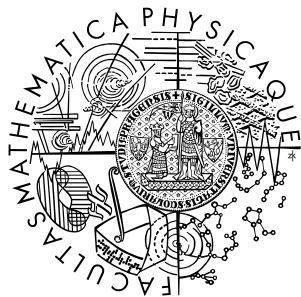


Mind Uploading



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1 Mozek v číslech —

Pocet neuronu $86.0 \cdot 10^9$ celkem
z toho $16.3 \cdot 10^9$ v neocortexu.
 $69.0 \cdot 10^9$ v mozecku
 $0.7 \cdot 10^9$ ostatni casti mozku.

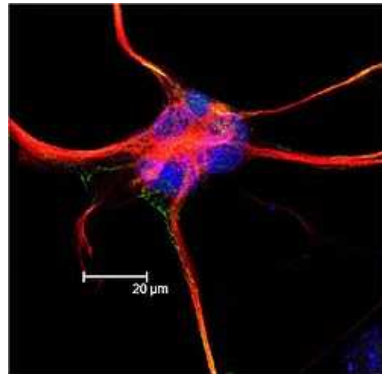
Pocet gliovych bunek $60.8 \cdot 10^9$ v neocortexu
 $16.0 \cdot 10^9$ v mozecku
 $7.7 \cdot 10^9$ ostatni casti mozku.

Velikost tela neuronu $4 - 20 \mu m$

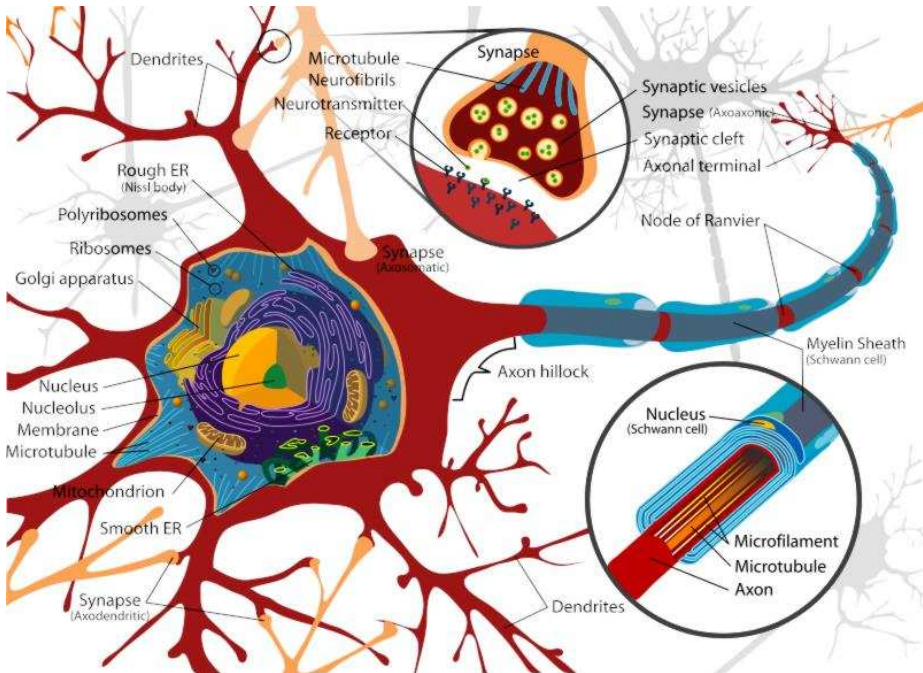
Prumer axonu: typicky $1 \mu m$, nejvetsi $20 \mu m$.

Pocet synapsi: $10^{14} = 100\,000 \cdot 10^9$

Prikon zhruba 20W, regulace prutoku krve.



2 Modely Neuronu



3 Komunikační kapacita

Corpus Callosum: $250 \cdot 10^6$ vláken.

Průměrná frekvence spikování: 7 Hz

Průměrná přenosová rychlost

Corpus callosum: 20 Gbit/s (\approx ethernet)

Celý neocortex: 5 Tbit/s ($28 \times$ komunikační propustnost PS3)

4 Kapacita pameti

Deklarativni pamet 10 bit/s.

24 hodin denne po dobu 50 let to da 1.84 GB

Video se zvukem 1MB/s by dalo 1504 TB

Mozny vliv sumu.

Odhad pres synapse:

64 bitu na synapsi 10^{14} synapsi, 10^{10} cilovych neuronu pro synapsi da dalsich 33 bitu.

Dohromady cca 12 byte na synapsi dava 1100 TB pro ulozeni topogie a nastaveni.

65536 identical 18-core processors = 1 179 648 ARM968 cores clocked at 200 MHz.

Each processor has an on-board router to form links with its neighbours, as well as its own 128 MB of memory to hold synaptic weights.

With over one million cores, and one thousand simulated neurons per core, the machine will be capable of simulating one billion neurons. This equates to just over 1% of the human brain's 85 billion neurons.

2006 Architectural commitments made

2009 Prototype chips made, and a four-chip test board evaluated

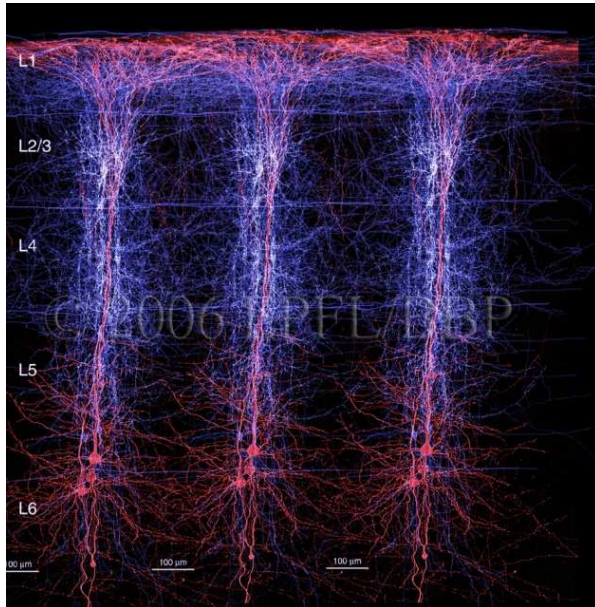
2011 Final SpiNNaker chips delivered to the lab in Manchester

2012 July - Partial machine built, one board containing 48 chips

2013 December - Full million-core machine expected to be complete

2014 Current funding expires

The Blue Brain Project EPFL
<http://bluebrain.epfl.ch>



7 Objections and Common Myths

Serial vs. Parallel Computing

Wetware Argument

Gödel's Theorem Argument

Quantum Effects

Duality Argument

Experimentalni overeni existence duse (kdyz to nevyjde)

Prakticka nesmrtnost (kdyz to vyjde)

Cestovani ke hvezdam

Technologicka singularita

Valka se stroji v horsim pripade, konvergence k jedne superbytosti v lepsim pripade