DEEP CUBE BREAKS WORLD RECORD FOR LARGEST GOLDEN RATIO CALCULATED (20,000 BILLION DIGITS AFTER THE COMMA) USING THE HPE APOLLO 6500 SYSTEM

Geneva, January, 18th 2020

Lausanne-based startup Deep Cube collaborated with Hewlett Packard Enterprise (HPE) to break the world record for calculating the largest Golden Ratio, also known as the Greek letter Phi and is expressed algebraically as: (Phi = $(1 + \sqrt{5}) / 2 = 1.618$ ....). It is an irrational number that goes on infinitely after its decimal point. Deep Cube used the HPE Apollo 6500 System, which is purpose-built for high-performance computing (HPC) and deep learning workloads, to achieve a record-breaking 20 trillion digits following the decimal point (or 20 times 1000 billion or 20 Tera Digits or in scientific notation: 20.10 power 12), in just 6 days and 34 hours, surpassing a previous record of 16 trillion Tera Digits calculated in 12.6 days and at the highest speed of computation (2.3 Tera Digits per day times faster in than the previous computation speed). Deep Cube has achieved a colossal feat (a bit like facing the Matterhorn) and to illustrate the representation of the figure Tera: a distance of 20 terameters is simply colossal as it is equivalent to 27 round back and forward trips from the Earth to the Moon.

This synergy between the DEEP CUBE algorithms and the HPE Apollo 6500 System allows the limits of current records to be pushed back. "*We smashed a speed record since the last record that had calculated 16 Tera Digits took for calculation 12.6 days and so we calculated in the end about 2 times faster than the previous record. For Deep Cube, this global computing record that I made with our AI engineers Alexandre Gouy and Cyril Hsu, uses HPC architectures from HPE and shows the synergy between mathematics and computing power of a massively parallel server. Infinite mathematical matrices will be at the heart of tomorrow's collective intelligence. The neural networks of DEEP CUBE solve the diagnosis of diseases such as cancer or neurological diseases, thanks to mathematics, to enable humans to invent the collective medical intelligence*" Chris Patris de Broé founder of Deep Cube.

Studied for decades, the Golden Ratio is one of the most fascinating irrational numbers. Symbol of perfection and aesthetics, the golden ratio is obviously found in mathematics but also in art, philosophy, architecture and culture. This number fascinates, inspires and questions by its ability to represent multiple phenomena.

Early 2019, Deep Cube joined the HPE startup program in Switzerland, aimed at enabling startups to develop their business activities, leveraging the HPE network, technology and expertise. To achieve the world record for calculating the Golden Ratio, Deep Cube used high-performance computing infrastructure at the HPE Geneva Customer Innovation Center (CIC)

About Deep Cube

Founded in 2018 and based in Lausanne Epalinges at BIOPOLE, in Switzerland, Deep Cube SA specializes in developing innovative artificial intelligence (AI) technology based on Deep Learning. The company operates two focus areas, one in analyzing skin disorders such as skin melanoma and skin non melanoma and the other in diagnosing human brain PET scans for Alzheimer's disease. Deep Cube is the recipient of prestigious awards and industry prizes: 2017 Best Ai Award at the Multimodal Emotion Recognition Challenge (MEC), best AI Award at the 2018 Convention on Computer Vision and Pattern Recognition (CVPR), 1st prize at the 2019 Consumer Electronics Show (CES ASIA) and 2nd prize at the 2019 World AI Conference (WAIC). Deep Cube's partnership with HPE is strategic for the company's approach to deploy AI with parallel computing of neural networks. The Swiss startup has just bought a spin-off from EPFL a few days ago and is currently looking for investors in its A-Round series.

More information is available at http://www.deepcube.ch   Contact: chris@deepcube.ch
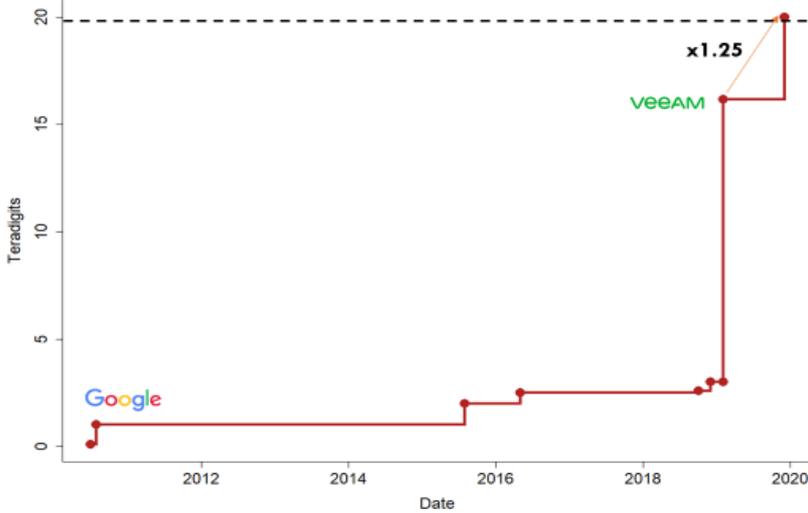
Phi (The Golden Ratio)

1.61803398874989484820458683436563811772030917980576286213544862270526046281890244970720720418939113748475408807538689175212663386222353693179318006076672635443338908659593958290563832266131992829026788067520876689250171169620703222104321626954862629631361443814975870122034080588795445474924618569536486444924104432077134494704956584678850987433944221254887706647809158846074998871240076521705751797883416256249407589069704000281210427621771117780531531714101170466659914669798731761356006708748071013179523689427521948435305678300228785699782977834784587822891109762500302696156170025046433824377648610283831268330372429267526311653392473167111211588186385133162038400522216579128667529465490681131715993432359734949850904094762132229810172610705961164562990981629055520852479035240602017279974717534277759277862561943208275051312181562855122248093947123414517022373580577278616008688382952304592647878017889921990270776903895321968198615143780314997411069260886742962267575605231727775203536139362107673893764556060592165894667595519004005559089502295309423124823552122124154440064703405657347976639723949499465845788730396230903750339938562102423690251386804145779956981224457417803417312645322041639723213404444948730231541767689375210306873788034417009395440962795589867872320951242689355730970450959568440175551988192180206405290551893494759260073485228210108819464454422318891319294689622002301443770269923007803085261180754519288770502109684249362713592518760777884665836150238913493333122310533923213624319263728910670503399282265263556209029798642472759772565508615487543574826471814145127000602389016207773224499435308899909501680328112194320481964387675863314798571911397815397807476150772211750826945863932045652098969855567814106968372884058746103378105444390943683583581381131168993855576975484149144534150912954070050194775486163075422641729394680367319805861833918328599130396072014455950449779212076124785645916160837059498786006970189409886400764436170933417270919143365013715766011480381430626238051432117348151005590134561011800790506381421527093085880928757034505078081454588199063361298279814117453392731208092897279222132980642946878242748740174505540677875708323731097591511776297844328474790817651809778726841611763250386121129143683437670235037111633072586988325871033632223810980901211019899176841491751233134015273384383723450093478604979294599158220125810459823092552872124137043614910205471855496118076426576511060545881475604431784798584539731286301625448761148520217064404111660766950597757832570395110878230827106478939021115691039276838453863333215658296597731034360323225457436372041244064088826737584339536795931232213473209957498894699565647360072959998391288103197426312517971414320123112795518947781726914158911779919564812558001845506563295285985910009086218029775637892599916499464281930222935523466747593269516542140210913630181947227078901220872873617073486499981562554728113734798716569527489008144384053274837813782466917444229634914708157007352545707089772675469343822619546861533120953357923801460927351021011919021836067509730895752895774681422954339438549315533963038072916917584610146099505506480367930414723657203986007355076090231731250161320484358364817704848181099160244252327167219018933459637860878752870173935930301335

. . . . 20 TeraBytes of digits (non displayed) . .

Last Decimal Digits: Golden Ratio

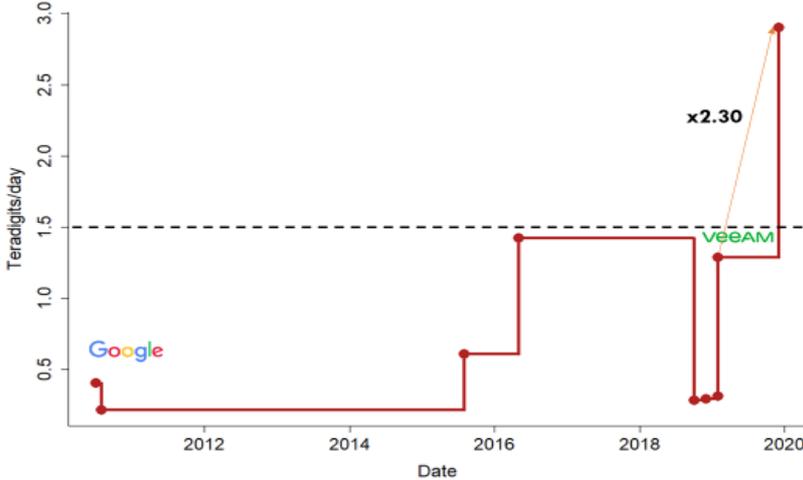|					
7535750816	0876303356	8685532469	4573570674	9918891722	: 19,999,999,999,950
6222135455	9437970692	1602428118	8549398394	6762507038	: 20,000,000,000,000

New world record in DIGITS

Golden ratio's known digits over time

- **our new record: 20 Tera digits**
- Previous record: 16 Tera digits
- **WR broken:** number of GR digits ever computed

New world record in SPEED

Golden ratio's computation speed over time

- **Other WR broken:** speed of GR computation (highest rate of computation ever achieved)

Golden ratio
New world record

Golden ratio: 20 x 1,000 billion decimals
20 teradigits / billion (French) / trillion (English)

20'000'000'000'000

20 terameters = eq. 27 back & forward trips Earth-Moon
(384 400 000 meters * 27 * 2 ~= 20 757 000 000 m)