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# THE CONVERGENCE OF HPC AND AI OBSERVATIONS AND INSIGHTS

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# FIRST WELCOME TO VERNE GLOBAL

- Established in Iceland 2007
- Optimised industrial scale data center solutions exploiting Iceland's cool climate and affordable power
  - hpcDIRECT - CPU & GPU bare metal clouds
  - powerADVANCE – tier-3 colocation
  - powerDIRECT – tier-1 colocation
- Rapidly becoming the focal point for industrial scale AI DNN training
  - It's just too expensive to do this in London, Frankfurt or New York
- “All AI training roads lead to Iceland”



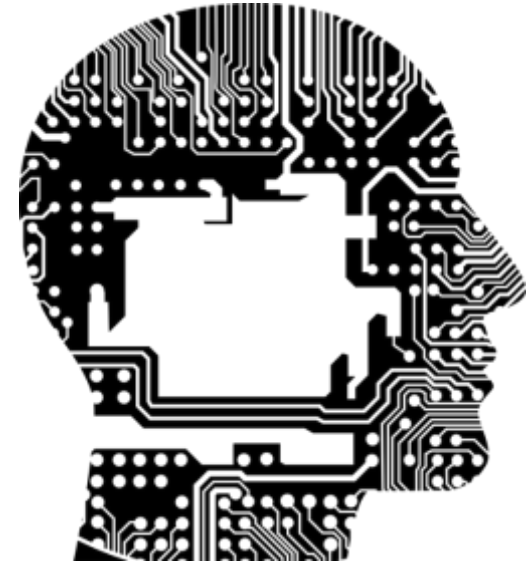
# The Convergence of HPC and AI

- HPC is the **use of super computers and parallel processing techniques for solving complex computational problems**
  - Often large simulations or big data analysis
- Machine learning is a method of **data analysis that automates analytical model building**
  - Sometimes programmatic learning logic using **modest HPC** or Deep Neural Networks (DNN) using **extreme HPC** for training and **modest HPC** for inference or execution on the data
- AI guided traditional HPC applications
  - Using DNNs to influence the methods and datasets that more traditional HPC applications use
- **HPC applications and compute clusters are destined to become tightly entangled with AI**
- Let's examine some AI folklore to better understand this evolution



# My Favorite 5 AI Observations/Rumours

1. Autonomous vehicle certification will require deterministic DNNs
  - MIT working on a historic training database
2. Germany's AI ecosystem gaining ground
  - October 2017 ~300 Glassdoor Machine Learning vacancies, October 2018 now ~2,100+!
3. The development environment controls the GPU price
  - Rich development ecosystems are expensive, good price/performance results from web forum support
4. AI is now powering HPC apps
  - Some CFD models are now using AI to define an appropriate sparse grid
5. Bitcoin miners moving to AI
  - Bitmain have developed some AI products and are starting to develop a software ecosystem

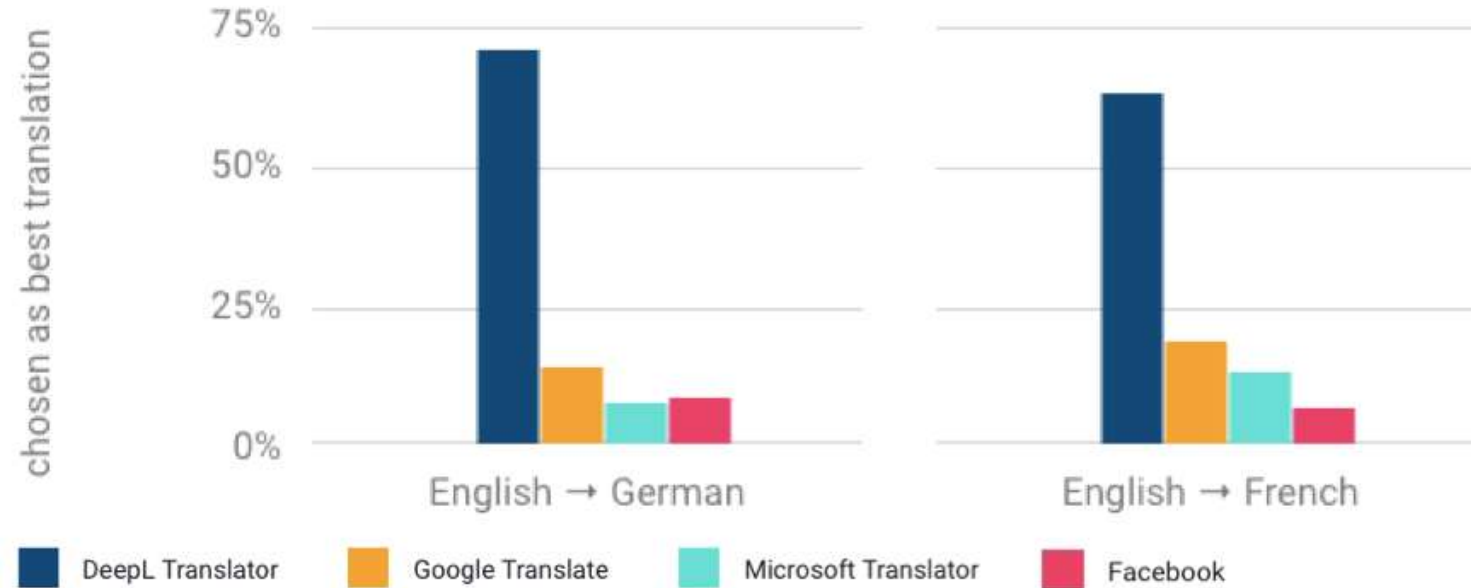


# Top 5 AI Tips

1. Be thoughtful adding more than 5 GPUs to a generic cloud
  - Ethernet connected clouds limit effective GPU performance – always pick InfiniBand solutions
2. Review your generic cloud strategy when spending €15,000/month or more
  - Examine bare metal clouds and even colocation of dedicated hardware if ~80% utilized
3. Inundate DNN data scientists in compute power
  - Avoid recruiting pain and expense by providing a great research sandbox – 8 GPU server or cloud service much cheaper
4. Not all AI training is created equal
  - Watch your budget with Natural Language Processing and Machine Vision especially video and 12M+ pixel images
5. Design a sustainable AI development environment
  - Avoid hardware, software and API road blocks, bare metal and containers appear to be a best practice



# German Best Practice - DeepL



*“We needed a data center optimised for HPC environments and determined that our needs could not be met in Germany. Verne Global’s Icelandic campus provides us with the scalability, flexibility and technical resources we need.”*

**Jaroslav Kutylowski**  
CTO, DeepL

Unable to find an HPC specialist data center in **Germany**, DeepL chose Verne Global to locate their 5.1 petaFLOPS supercomputer. This supports their AI driven, neural network translation application, which is viewed by many as the world’s most accurate and natural-sounding machine translation service

# Kickstart Your AI/HPC

- **Have industrial scale DNN training in your future - join us in Iceland**
  - Brainstorm with HPC/AI leaders at Verne Global's location
  - Network with Reykjavík's start-ups and University Institutes pushing the AI envelope
  - Commercial and academic AI pioneers / visionaries
- Sign-up now





# Let's Chat AI & HPC

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