Disruptive Technologies

CURRENT AND UPCOMING MAJOR TRENDS

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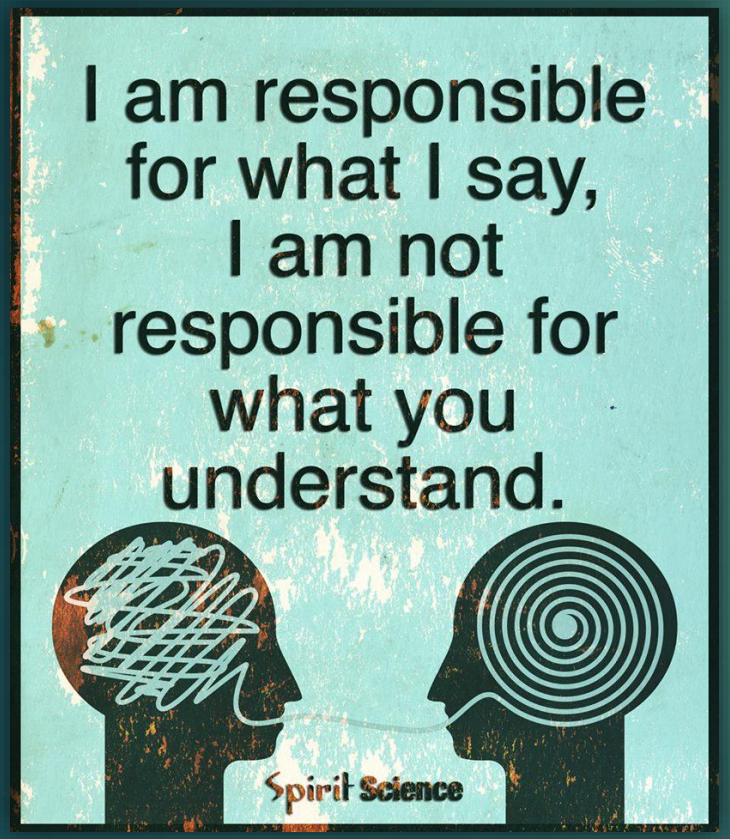
BIO

- Head of Cybersecurity, Data and Algorithms, DevOps/IT at Thales. Senior GRC expert (cloud security) until August 2026.
- Senior expert in information and data security, cybersecurity, and intelligence. **Mathematical engineering**.
- Over 35 years of experience (military, university/R&D, industry)
- Professor at over 15 universities/engineering schools (including HSE Moscow)
- Engineer, Doctor of Mathematics, accredited to supervise research in computer science (HDR), NATO certifications in intelligence.
- Legal expert (terrorism, organized crime, financial fraud, Paris court) and military cryptanalyst for many years.
- Editor-in-chief of the Journal of Computer Virology and Hacking Techniques.
- Scientific advisor to Hope4Sec.

DISCLAIMER



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They belong exclusively to the speaker and in no way represent those of any individuals, institutions, companies, or organizations with which the speaker may or may not be associated professionally or personally (including past, present, and future employers).

AGENDA

- Focus on information technology (including data technologies: ML, Big Data, AI)
- Current risks and challenges
- Technological responses
- Conclusion and discussion with the audience

Risks & Challenges

THE MAJOR CHALLENGES AHEAD

Selected Reference: CSR

- ISO 26000
  - Energy and environmental issues
  - Security issues
  - Sovereignty issues
  - Societal issues
  - Fundamental and human values.

Illustrations

- The energy and environmental impact of the data industry (processing, storage, transfer, use) is becoming increasingly significant.
- Security issues
  - Major risks: massive data leaks, business disruption, AI-augmented attacks
  - *https://bonjourlafuite.eu.org*
  - https://informationisbeautiful.net/visualizations/worlds-biggest-data-breaches-hacks

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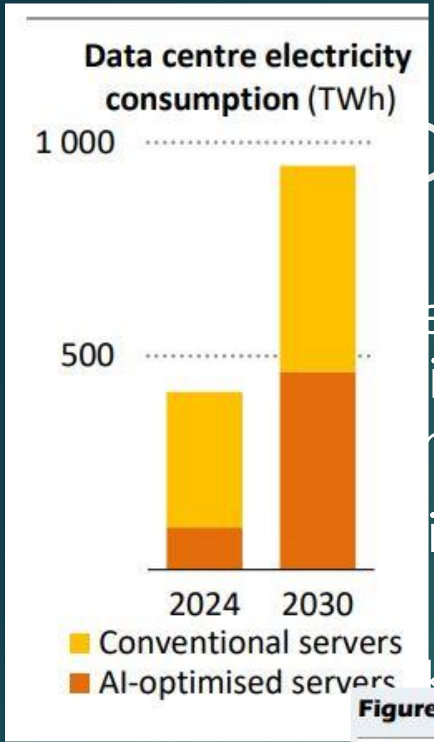
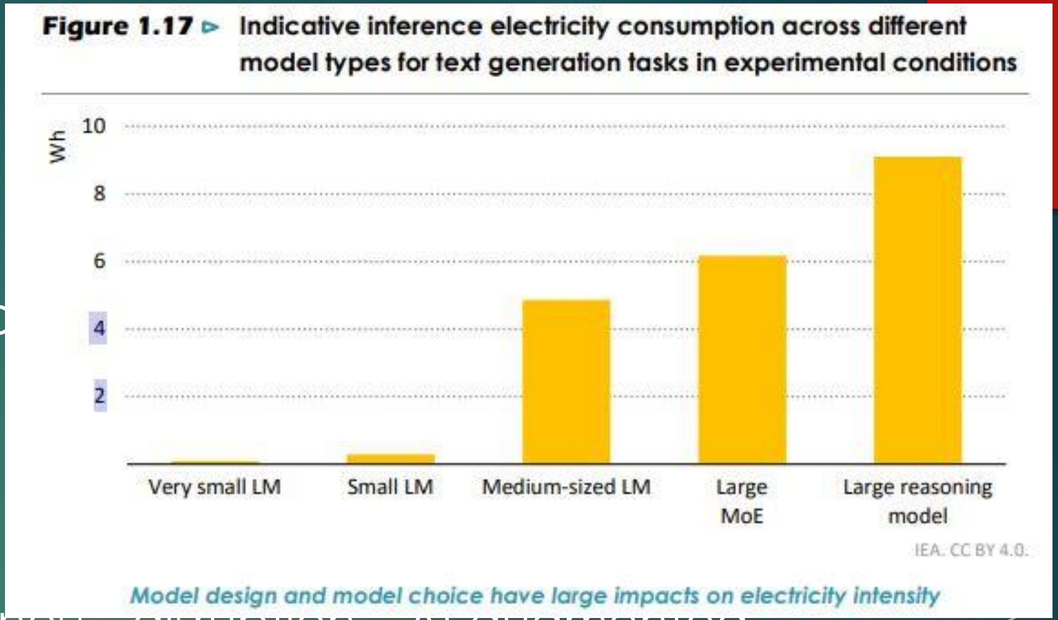
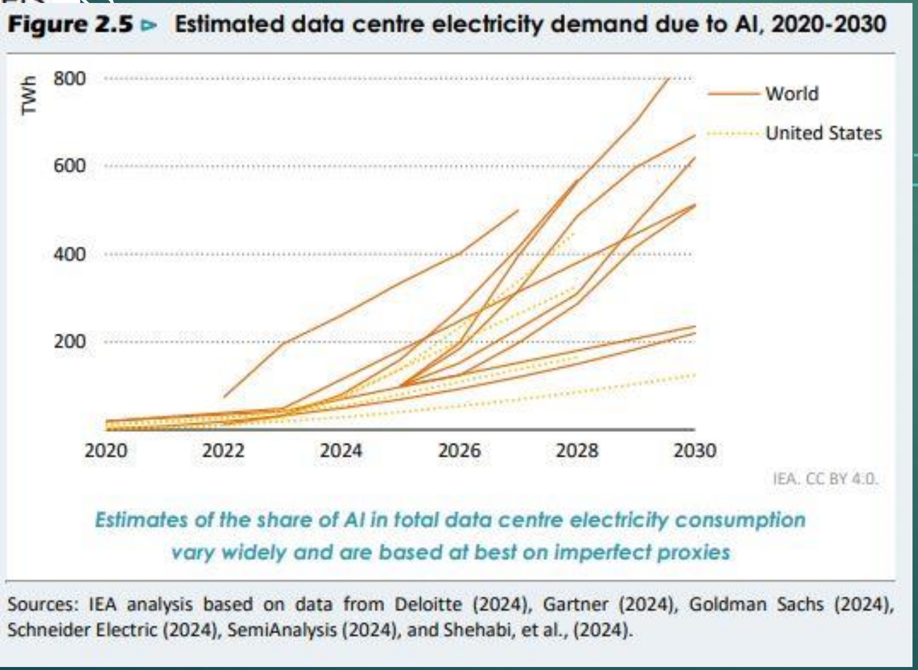
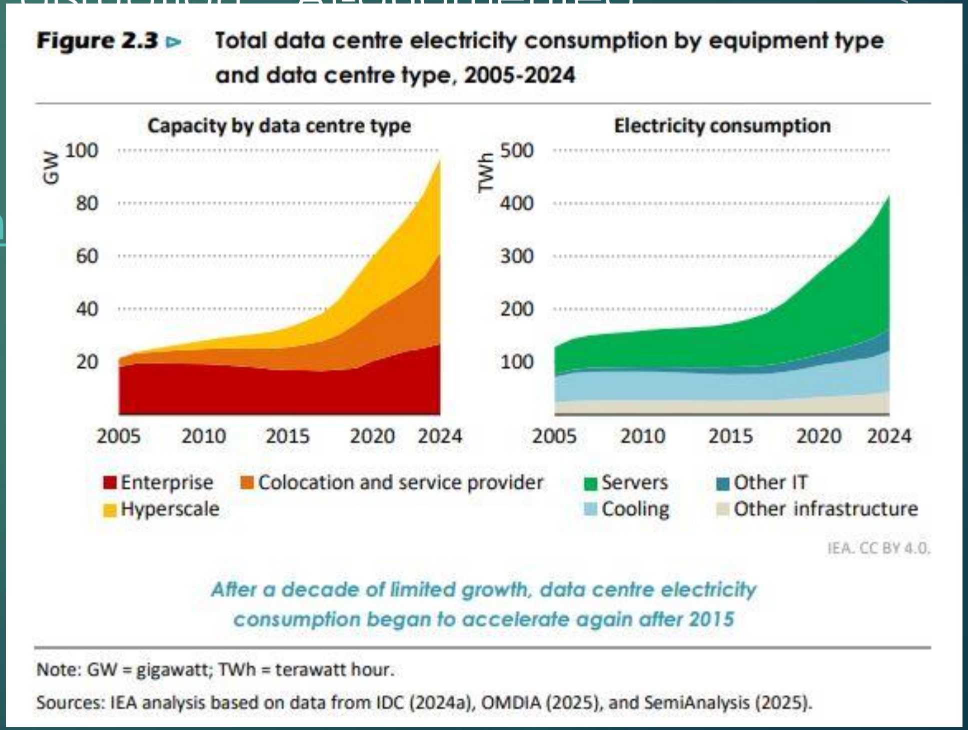
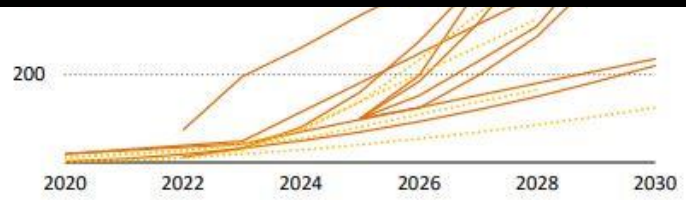








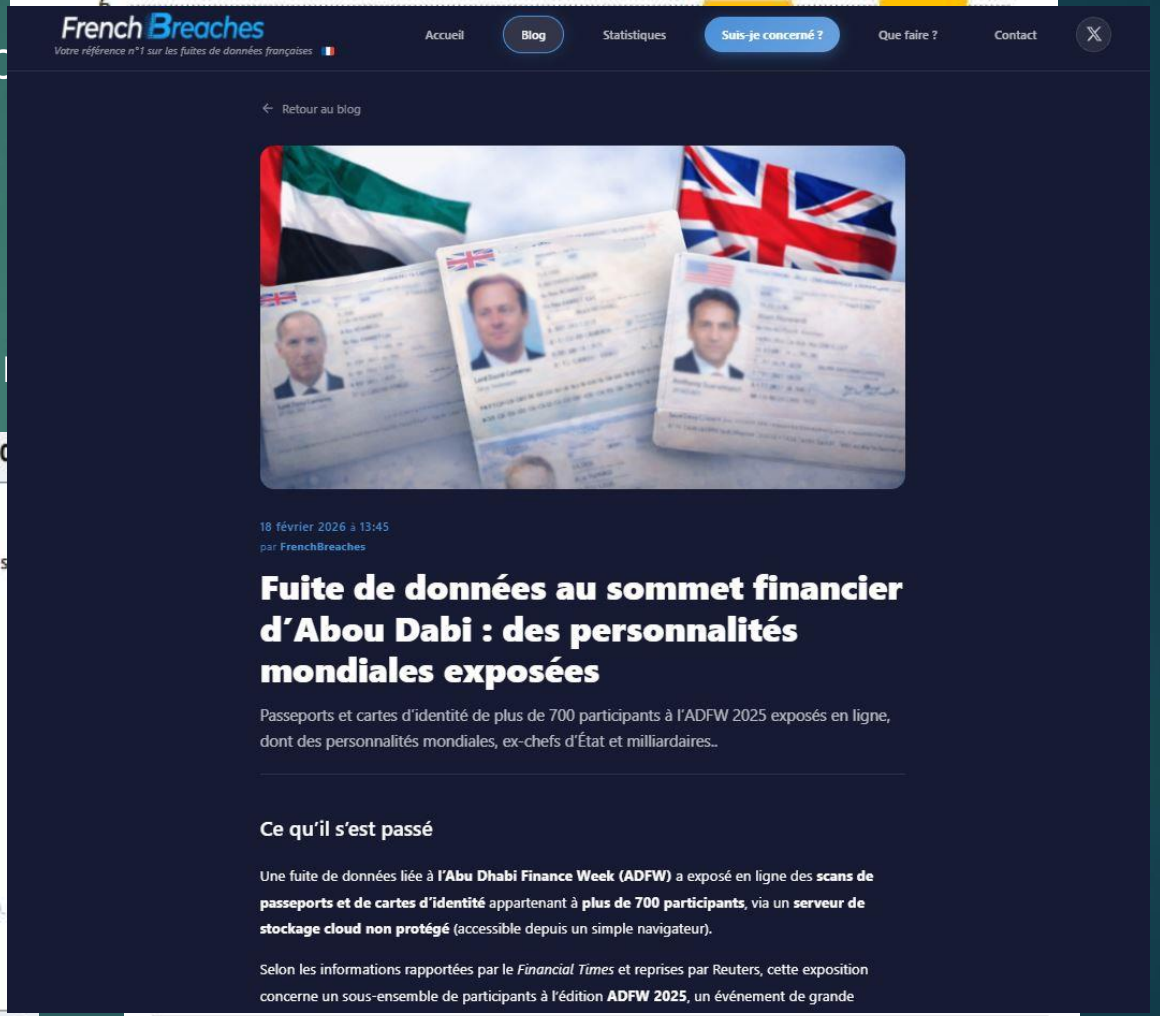
Data centre electricity



Estimates of the share of AI in total data centre electricity consumption vary widely and are based at best on imperfect proxies

Sources: IEA analysis based on data from Deloitte (2024), Gartner (2024), Goldman Sachs (2024), Schneider Electric (2024), SemiAnalysis (2024), and Shehabi, et al., (2024).

Figure 1.17 ▻ Indicative inference electricity consumption across different model types for text generation tasks in experimental conditions



Note: GW = gigawatt; TWh = terawatt hour.

Sources: IEA analysis based on data from IDC (2024a), OMDIA (2025), and SemiAnalysis (2025).

Illustrations (contd)

- Sovereignty issues
  - Software has a nationality and is therefore subject to laws that are often extraterritorial.
- Societal issues
  - Increasingly widespread global surveillance.
  - Loss of freedom.
  - Economic and state espionage.
  - https://www.digital-prison.com/global-surveillance-map

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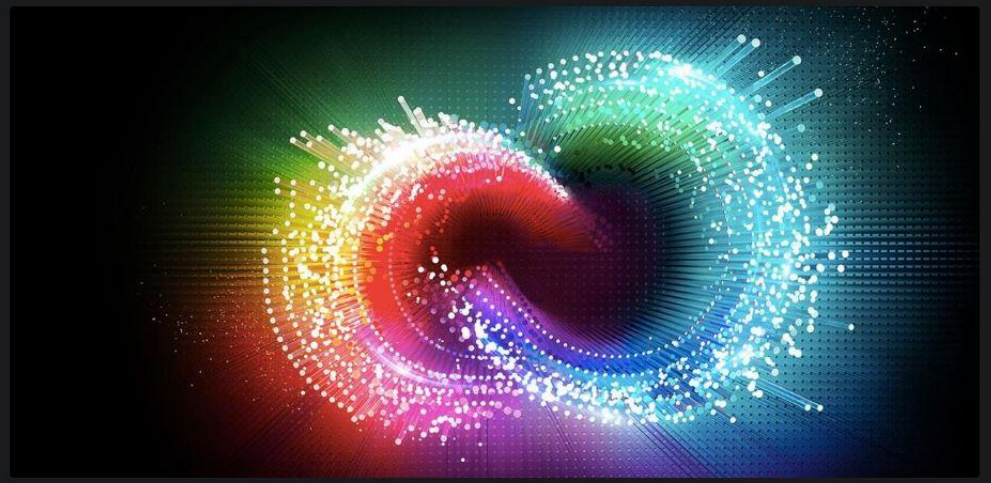
Connexion Abonnez-vous

Suite à un décret présidentiel, Adobe va couper les comptes de ses clients au Venezuela



Sébastien Gavois
Le 08 octobre 2019 à 09h21

2 min | Droit

Suite à un décret présidentiel, Adobe va couper les comptes de ses clients au Venezuela

Commentaires 35

Comme l'indique The Verge, l'éditeur prévient ses clients par email et a également mis en place une page d'assistance dédiée :

« Le gouvernement américain a publié le décret 13884 qui a pour effet d'interdire la quasi-totalité des transactions et des services entre entreprises, entités et particuliers américains avec le Venezuela. Pour rester en conformité, Adobe désactive tous les comptes au Venezuela ».

L'éditeur ajoute que ce décret présidentiel n'a pas de date d'expiration, *« la décision de l'annuler incombe uniquement au gouvernement des États-Unis ».*

Les clients concernés ont jusqu'au 28 octobre pour télécharger le contenu enregistré sur leur compte Adobe. Passé cette dates il sera désactivé. Aucun remboursement pour les achats ou abonnements en cours ne sera proposé ; Adobe explique que c'est l'une des conséquences du décret.

NEXT

Connexion Abonnez-vous

Microsoft a supprimé le compte email du procureur de la Cour pénale internationale

Martin Clavey
Le 16 mai à 16h51

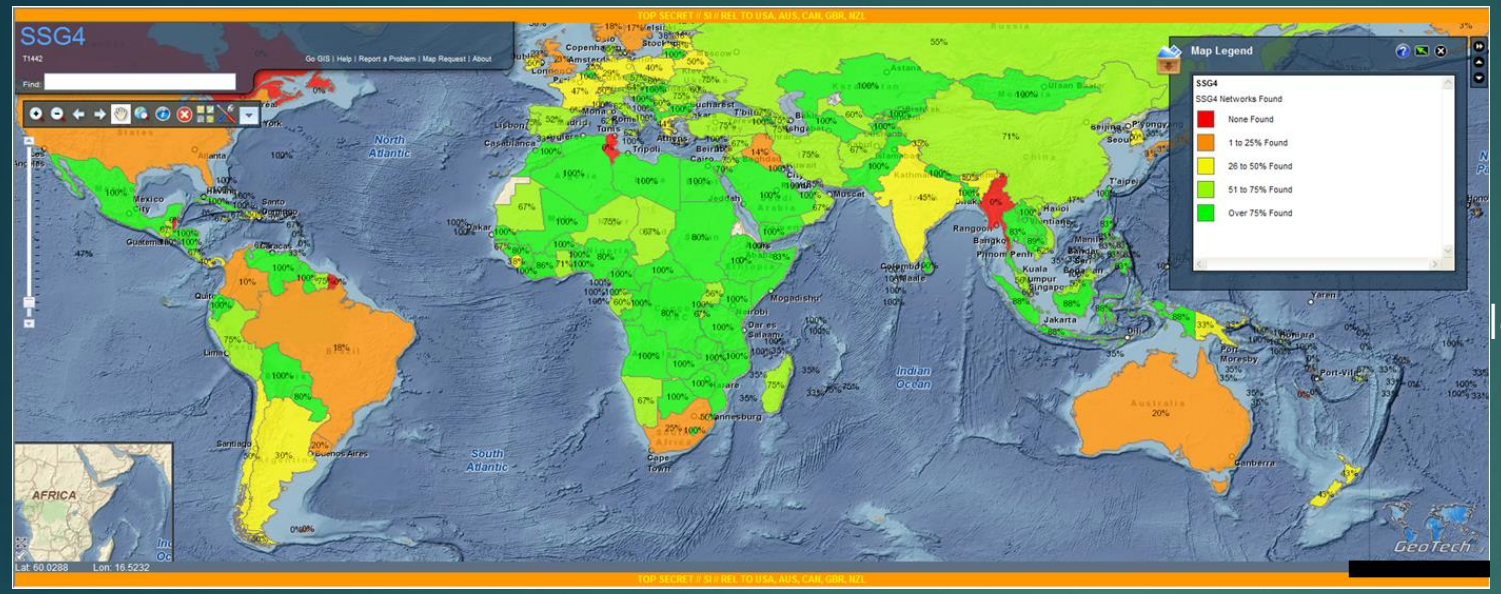
1 min | Société numérique

Microsoft a supprimé le compte email du procureur de la Cour pénale internationale

Commentaires 15

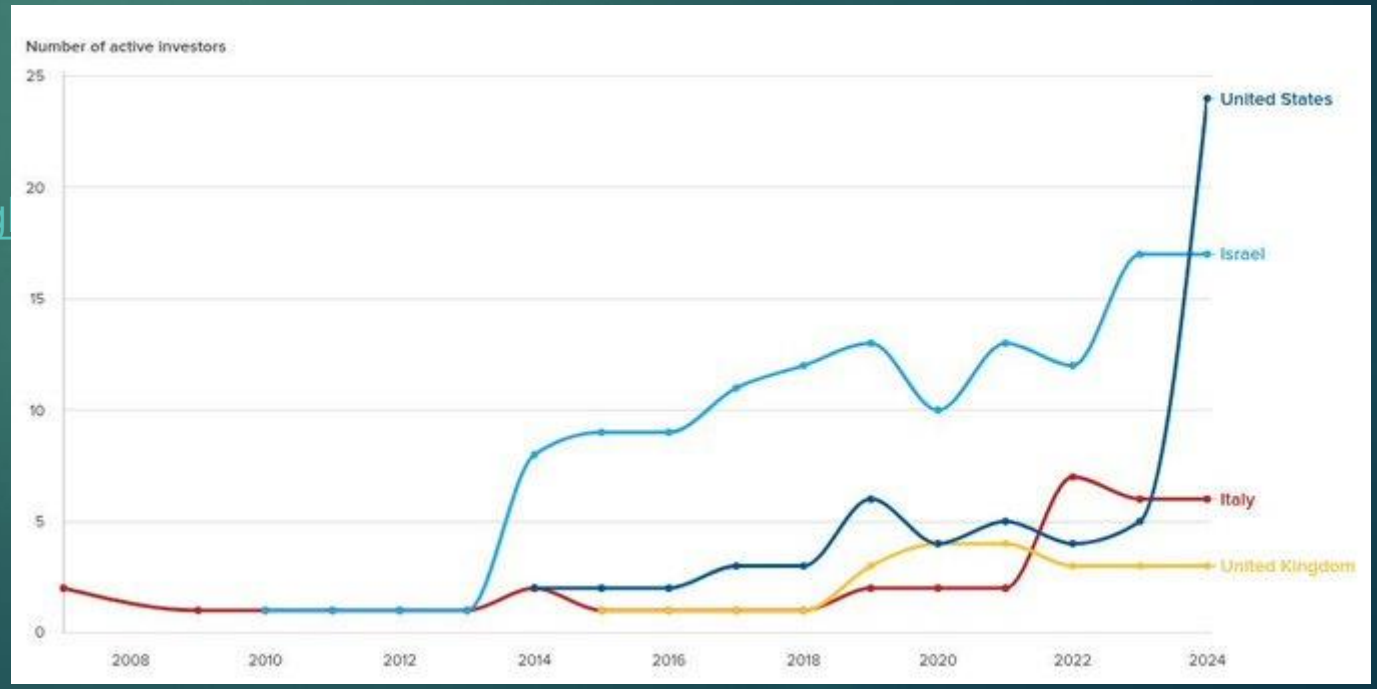
En février, Donald Trump avait annoncé des sanctions contre la Cour pénale internationale (CPI) en réaction aux enquêtes lancées contre Israël pour des crimes de guerre perpétrés à Gaza. Associated Press évoque des conséquences concrètes pour l'organisation internationale.

Notamment, Karim Khan, le procureur de la CPI, a vu son compte email supprimé par Microsoft. L'agence de presse explique qu'il a été contraint de passer à Proton mail. Rappelons que Proton est gérée depuis l'année dernière par une fondation suisse. Microsoft n'a pas souhaité répondre à nos confrères.



laws that are often

- Loss of freedom.
- Economic and state espionage.
- https://www.digital-prison.com/g



Technological Responses

DISRUPTIVE INNOVATIONS & NEW MARKETS

Challenges

- The markets for trusted technologies, sovereignty, and the protection of fundamental values have enormous potential.
- The solution must come, and will come, from civil society (businesses and citizens).
  - https://european-alternatives.eu
- Everything still remains to be invented.
- The following are just a few ideas among many other possibilities.

Technological Advances in AI

Table 2.1 ▷ Current and potential 2030 energy savings in data centres from key technologies and approaches

Technology/approach	Current adoption	Expected adoption in 2030	Scale of energy savings potential
Hardware			
Low-power processors	●●	●●●	●●●●
AI accelerators	●●●	●●●●	●●
Task-optimised hybrid processors	●●	●●●	●●
Photonic integrated circuits	●	●●	●●●
Energy-efficient memory and storage	●●●	●●●●	●●
Memory proximity	●●	●●●	●●
Innovative cooling technologies	●●	●●●●	●●
Software			
Energy-efficient algorithms	●●	●●●●	●●●●
Task-specific models	●●	●●●●	●●●●
Model and code optimisation	●●	●●●	●●●
Cross-cutting			
Codesign of software/hardware	●●	●●●	●●
Edge computing	●●	●●●	●●●
Virtualisation	●●●●	●●●●	●●
Intelligent energy management	●●●	●●●●	●●
Quantum computing	●	●	●●●
Neuromorphic computing	●	●●	●●●●

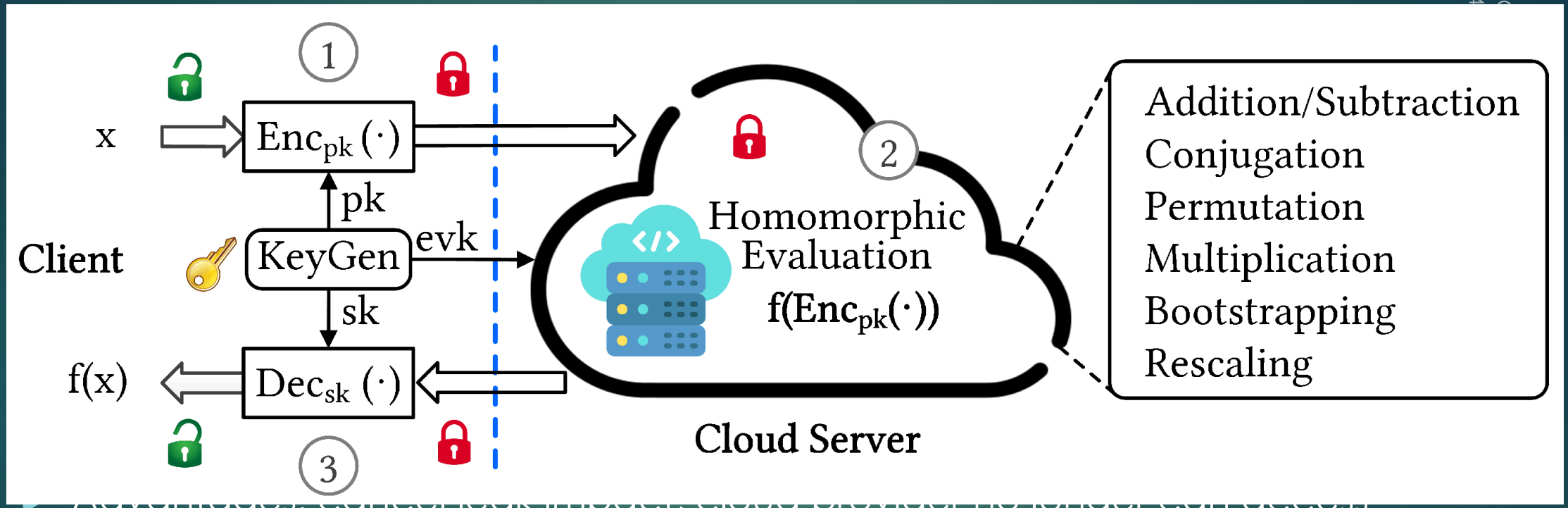
Note: A greater number of dots indicates a higher scale.

- RISC-V revolution to be launched (finally!)
- Development of SLMs/RAGs
- Improvement in data quality (combining efficiency and minimization/frugality)

Optimal Data Protection

- Homomorphic encryption
  - Processing data in encrypted form (AI, database queries, etc.)
  - Current techniques (FHE) are incompatible with operational, environmental, and energy challenges.
  - New trends: HbHAI (*Hash-based Homomorphic AI*)
    - https://hope4sec.eu/pages/homorphic-artificial-intelligence.html
    - Reduction in data size and computation time by a factor of between 3 and 10
    - Use of native existing tools without rewriting
- Advantages: cancel leak impact, cloud provider no longer can access users' data

Optimal Data Protection



- Advantages: cancel leak impact, cloud provider no longer can access users' data

Security and Protection of Freedom

- Low entropy encryption
  - Encrypted data is immediately detected
  - Transmit highly secure data without detection
  - Illustration: sensitive data encrypted as a log file (key size 256 bits)
- TRANSEC technologies (multi-level, CCC)
  - Conceal the very existence of a transmission
  - E.g.: https://hope4sec.eu/pages/multi-level-data-protection.html
  - High-volume hidden communications on social networks
- Variable algorithm cryptology (as many algorithms as users)

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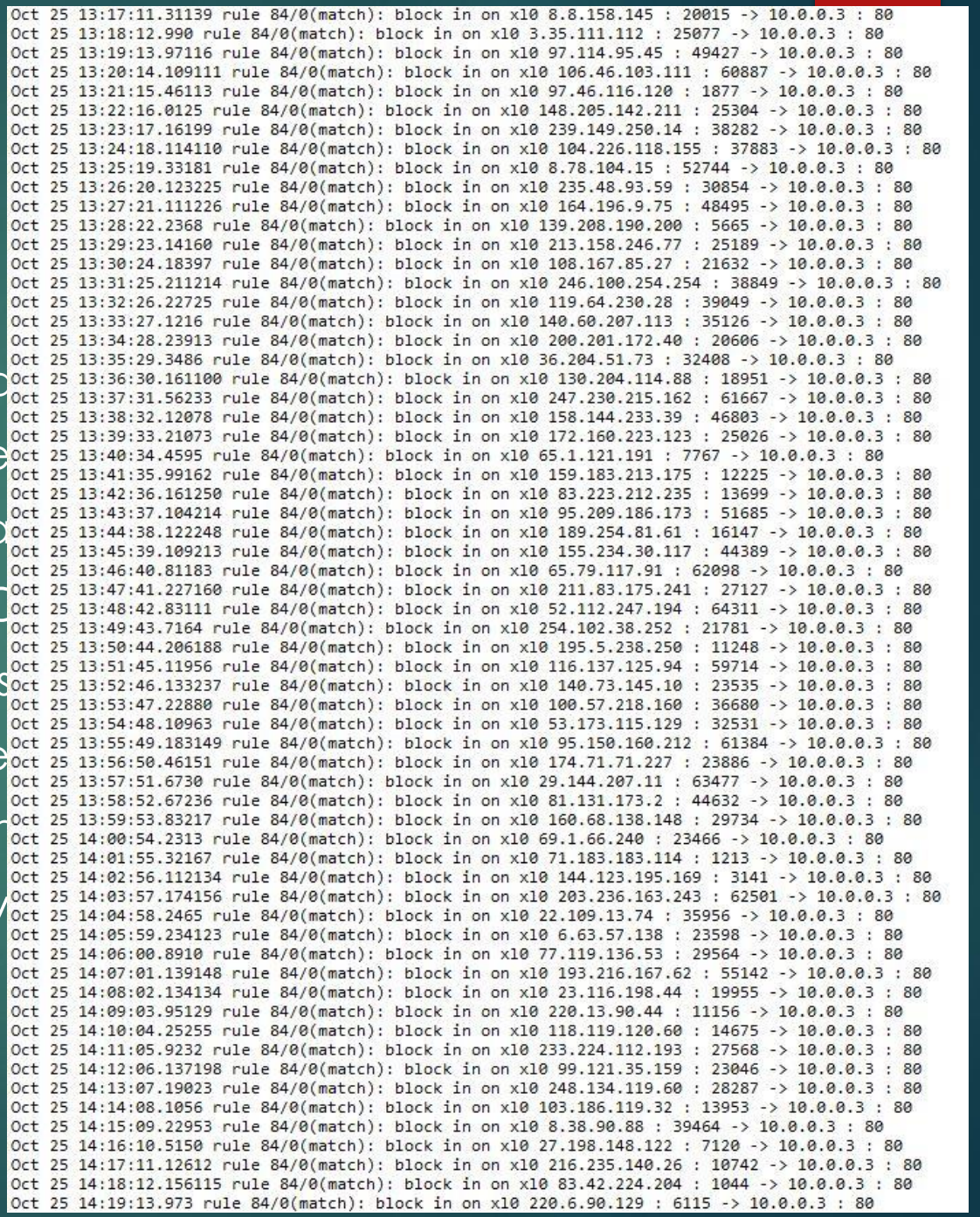

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Oct 25 13:17:11.31139 rule 84/0(match): block in on x10 8.8.158.145 : 20015 -> 10.0.0.3 : 80
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Oct 25 14:03:57.174156 rule 84/0(match): block in on x10 203.236.163.243 : 62501 -> 10.0.0.3 : 80
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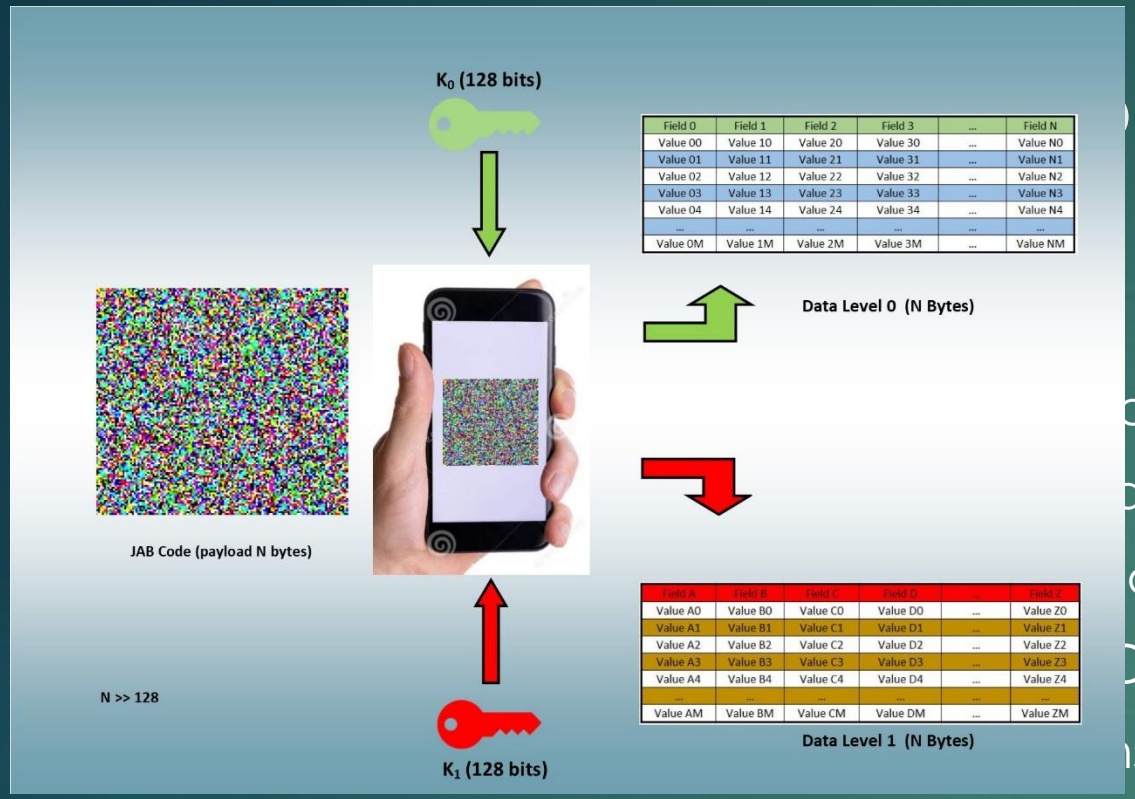

- E.g.: https://hope4sec.eu/pages/multi
- High-volume hidden communications
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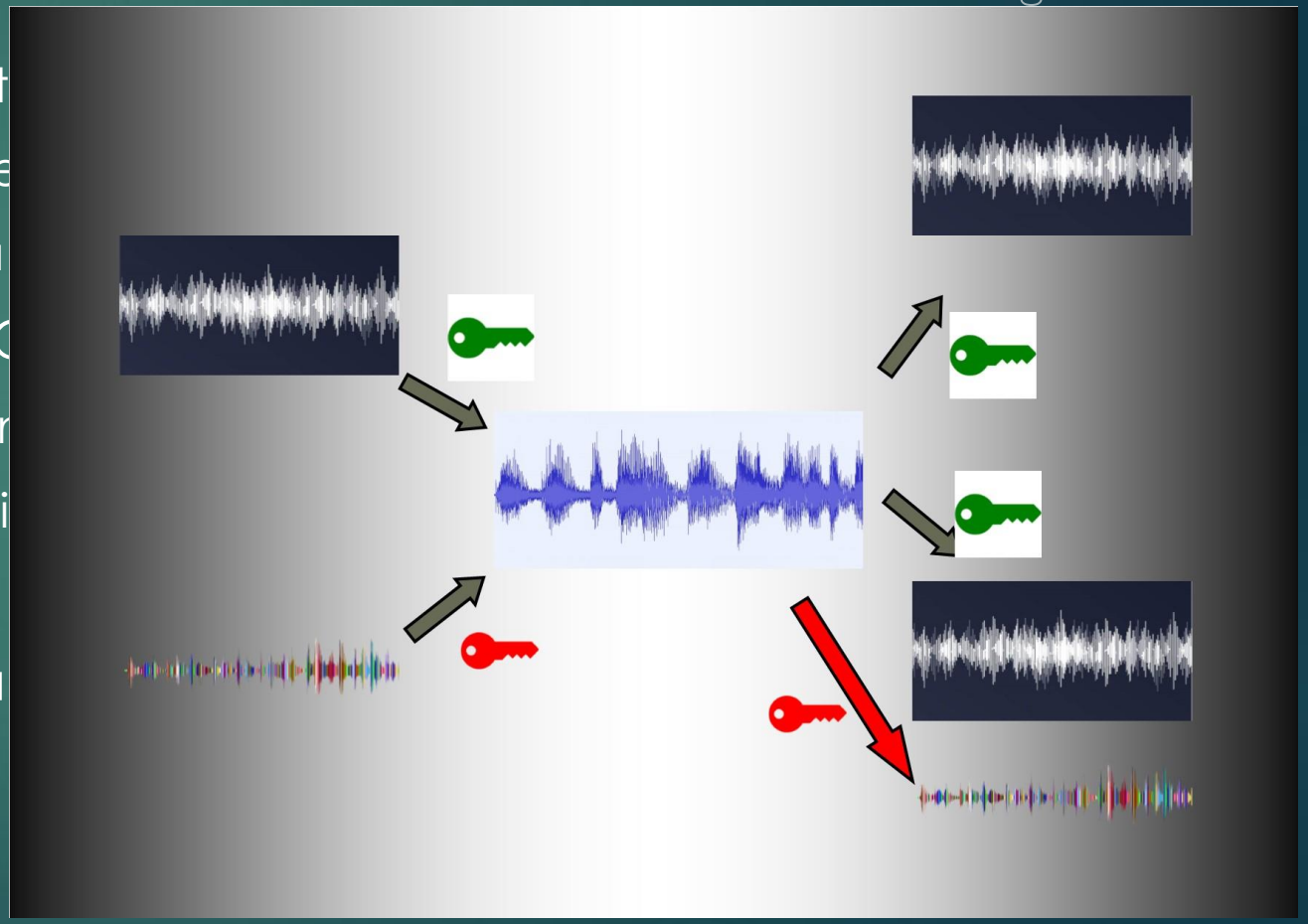

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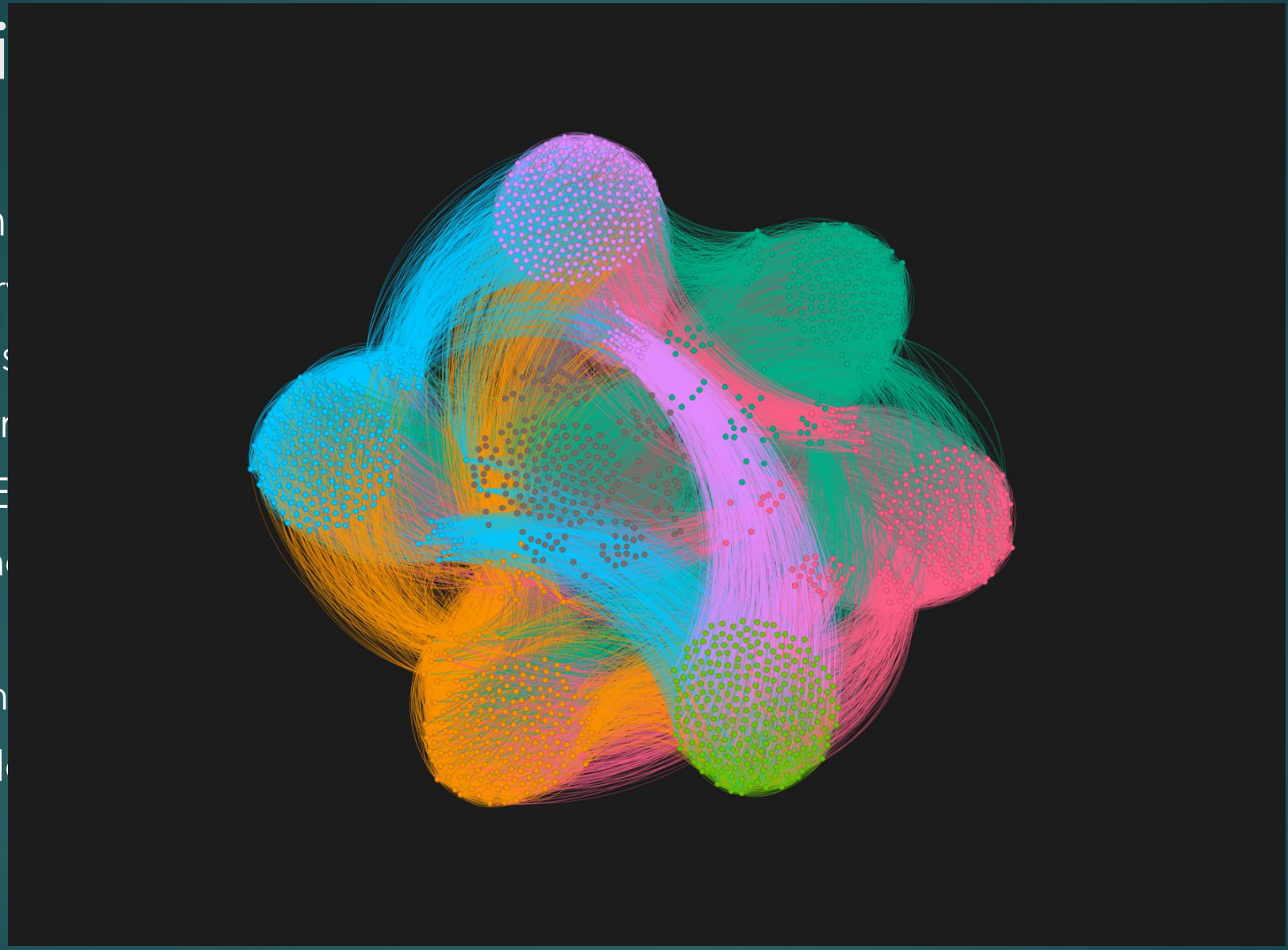

Conclusion

Huge Challenges Ahead

- We have become more dependent on digital transformation than on any other technological revolution in history.
  - The risks have never been as great as they are now.
  - Innovation is no longer just a question of wealth creation, but also of societal resilience.
- HR - Human beings are the new rare earths.
  - The challenge of training, skilling, reskilling and upskilling.
  - An extremely worrying decline in scientific teaching, particularly in mathematics.
  - A demographic and economic time bomb.
- **BUT enormous potential and markets to be created.**

Questions & Answers