

CYBER:\PROMPT

AIR UNIVERSITY | AIR FORCE CYBER COLLEGE Borderless Data in a World of Borders¹

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Senator Michael Cunningham¹ is a first-term independent senator who will shortly be casting his vote on the Data Protection Act, a highly contested piece of legislation. The Data Protection Act would require sensitive US data to be stored on servers in the United States. Senator Cunningham's vote could be tie breaking. He is meeting with Ms. Amanda Santos, the chief executive officer of Perpetuity, a company headquartered in his state. Ms. Santos is asking Senator Cunningham to vote "no."



Following a highly publicized news story of a hack of US citizen data that was attributed to Chi-

na, Senator Bobby Dinh proposed the Data Protection Act, which would require that all sensitive electronic data, including personal information of US citizens and data relevant to national security, be stored only on servers located in the United States. "It is ridiculous that the United States cannot act to protect the data of its citizens because the data is stored in foreign countries. And it is particularly ridiculous that important data is being stored in China. What is to stop the Chinese government from directly accessing that data, requiring a company to hand it over, or just shutting down the servers?" Many countries, including Russia, China, Australia, and countries in the European Union, have already passed laws directing that certain types of data be stored within national territory.²

Santos explains that Perpetuity is a multinational company offering enterprise cloud data storage solutions to client businesses. The global cloud storage market is a highly competitive, growing market, estimated at \$263 billion in 2020.³ Among Perpetuity's many clients are the multinational MegaBank and OwnYourGenome, a DNA sequencing service for consumers. Senator Cunningham recognizes the name, as he recently ordered and received an OwnYourGenome analysis of his DNA.

Clients who purchase "cloud storage" interact with the company through a user interface that makes the details of how their files are stored invisible. All the clients want to know is that they can access their data instantly whenever they need it.

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1. All people, companies, and events in this case study are fictitious and any resemblance to any actual person or company is unintentional and coincidental. All views presented in this document are those of the speaker or author and do not necessarily represent the views of the US Department of Defense or its components.

2. See DLA Piper, "Data Protection Laws of the World," DLA Piper, 2021, <https://www.dlapiperdataprotection.com/>.

3. Craig S. Smith, "How the Cloud Has Opened New Doors for Hackers," Washington Post, 2 March 2020, <https://www.washingtonpost.com/technology/2020/03/02/cloud-hack-problems/>.

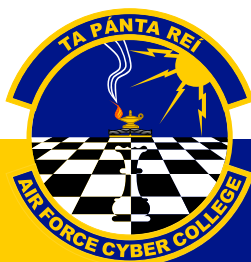


To provide clients with the speedy access and resilience that they take for granted, Perpetuity uses a distributed data storage system. Centralized databases require all users to access the same data file. This works when the database is small and the users are small in number and located near the database; otherwise, it can lead to bottlenecks and slower access speeds. Distributed storage speeds user access both by dividing the files into “chunks” or “blocks” so that different users can access different parts of the file simultaneously, and by maintaining multiple copies of the database so that users can interact with different copies simultaneously.

Having multiple copies requires more storage space but also provides resilience. If one block or file becomes corrupted or inaccessible, users can be seamlessly switched to access other copies. For even greater resilience, blocks or copies may be housed on different computers, including computers in different locations. Storing the data in different locations can also improve response time by allowing users to access the copy that is closest to them. Perpetuity has many data centers, which are large warehouses full of servers on which client data is stored. These warehouses are located in countries around the world, including the United States, Singapore, Belgium, and China.

Ms. Santos says, “Perpetuity cannot compete with other cloud storage providers if it must pay the higher costs of determining whether data is sensitive and then maintaining it exclusively on expensive US servers. Perpetuity will also be disadvantaged in providing services to its multinational clients and clients outside of the United States because of problems with latency. If governments continue to pass this type of law, it could put us out of business and ultimately break the internet.”

Reflecting on the meeting as he gets ready to go down for the vote, Senator Cunningham suddenly feels a chill. He wonders, for the first time, where his DNA data is stored and who can access it.



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