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Assessment Three

Edge of Web Technology

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## What is Quantum Computing?

Quantum computing uses phenomena from quantum mechanics to perform computations that are roughly comparable to computations made by regular computers (National Academies of Sciences, Engineering, and Medicine, 2019, p. 250).

The quantum mechanics phenomena include:

* Superposition

Where a regular computer represents values through the use of bits (0 or 1) a quantum computer uses quantum bits or qubits which can be “0 or 1, or some combination of both at the same time” (National Academies of Sciences, Engineering, and Medicine, 2019, p. 2).

* Entanglement

Quantum entanglement would allow quantum computers to use a ‘quantum communication protocol’ known as Superdense Coding. This protocol allows one qubit to send two classical bits of information between a sending and receiving user (Jadhav, 2021).

Whether entanglement is a necessity in creating a quantum computer is still a matter of debate, though most researchers believe it is necessary (Scott Amyx, 2017).

## Relevance to the contemporary Internet

When quantum computers become available we should see an increase in the processing power available to Internet services resulting in decreased processing time. This however does not necessarily mean that Internet speed will increase, which could mean the greatest impact would be that servers could handle a greater number of clients.

One big change will be encryption, as some encryption methods used today can’t hold up to the power of quantum computers, e.g., asymmetric encryption. However, with a bit of work, symmetric encryption could hold up to quantum computers (Savvy Security, 2017).

However, securer encryptions could be created through the use of quantum computers.

Quantum computers can perform certain operations “in a matter of seconds whereas a classical computer would take, in some cases, more than the age of the universe” (E-SPIN, 2018).

### Impact on Internet services in the near future

“… it is highly unexpected that a quantum computer that can compromise RSA 2048 [[1]](#footnote-1) or comparable discrete logarithm-based public key cryptosystems will be built within the next decade.” (National Academies of Sciences, Engineering, and Medicine, 2019, p. 157).

## How I investigated

I searched for papers on ProQuest with the following search parameters:

Search term: ‘"artificial intelligence" "web technology"’

Scholarly Journals

Within the last 3 years

Peer reviewed

Then I looked for papers that would be useful for what I would write about in this review of leading-edge web technology.

I also searched on the internet for possible applications of quantum computing technology.

## Implementing the web technology on my website

Quantum computing is primarily a hardware solution in the search for more processing power and is still being developed. But if and/or when it becomes a viable product then it may be as easy as plug and play provided the Operating System (OS) is compatible with the existing programming of regular computers.

If that is not the case then the website would have to be built from the ground up or at least converted to work with the operating system of a quantum computer.

## Impact of this technology on internet users

As a result of quantum computers, Internet users should see faster response times from servers however the primary use case of quantum computers is likely going to be big data solutions (‘Benefits of Quantum Computing’, 2021). I expect that server-side solutions that would have previously used too much processing power may then be implemented providing greater functionality.

It is also possible that Internet speed could be increased as a result of quantum computers.

## Conclusion

While mainstream quantum computing is likely still at least a decade off, when it becomes available, the increased Processing Power will create many opportunities, not just for web technology. Quantum computers will be capable of simulating scenarios far more complex than regular computers could handle and finding solutions to things such as traffic management and maybe even web infrastructure improvements.

I look forward to seeing what quantum computing will bring to web technology and technology in general in the future and how our lives might change as a result.

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1. “**RSA** (**Rivest–Shamir–Adleman**) is a public-key cryptosystem that is widely used for secure data transmission” (‘RSA (Cryptosystem)’, 2022). [↑](#footnote-ref-1)