



Quantum Technologies for Digital Transformation and Informatica Security

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Abstract

Over time, technology has approached us in our increasingly present environment, currently depending to carry out activities with the support of technology and without it it is not possible, everything is really systematized. The digital transformation has completely restructured social mutations, such as interactive coexistence in our social environment, we communicate virtual through social networks in real time. The present investigation is oriented to computation and quantum information. At the beginning of the last century, Quantum Computing had research by scientists such as [1,2], their thinking focused on elucidating the proposed dilemma of black body radioactivity. In the last century, [1] ingested all radiant energy, with the purpose of determining the spectral domain of a radiation, through a quantized or discrete path processing. The explorations led [1,2] to inspire the research study of energy, atoms, particles and identifying themselves as precursors of quantum physics and technology, a path that they extended [3,4,5,6,7,8,9]. Within quantum technology, information is the quantum equivalent, in the area of traditional information that experiences how to measure, accumulate and transport information. Through the internet system, telephone calls are made, as well as payments through a card, creating and forming data that travels at high speeds in the world close to light.

Keywords: quantum, computation; information; security; intercalation; Qubits; overlap

1. Introduction

In the last century 1900, there are theoretical models of quantum technology in relation to computing and information, the result of research studies of many decades; that due to various impulses, its exit to public knowledge has not crystallized, as well as the development of cybernetic change technology, destroying models and paradigms of traditional computing, and starting with the evolution of the quantum universe. The traditional computer executes dissimilar operations in the memory system, processes, storage that manage to subsist in milliseconds, minutes, and hours according to complexity and confusion of the systematizations and / or operations that it performs, in relation to quantum computing the same procedures will be executed in milliseconds, which stimulates quantum cryptography vision,

According to technology, quantum physics determines a molecule, object, atom that would reside in two different areas in real time [2]. It is extremely important to study and analyze two particles that reside in dissimilar areas of the universe that would be intertwined; It is unknown and impossible to know exactly the types of the subatomic atom, which is why it does not show a definitive perspective or trajectory, on the contrary that they are in dissimilar areas at the same time with different possibilities, which is called superposition, an example in relation to the entanglement of duality of particles, producing some modification in any of the particles, it automatically transforms the state, the special

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union is preserved even when the particles are located at both ends of the universe; for which he defined the over-entanglement itself as a "ghostly action at a distance." It also determines its interpretation of entanglement as reciprocity of the information of both particles, in the same way it determines information units as the generation or creation of reality, but not the components of matter and / or energy [10]

The quantum computer is part of the great object that manages to reside in different states at the same time, creating more efficiently than a traditional computer (integrated by thousands and millions of the particles that they exchange). The traditional computer comprises 1bit that obtains a maximum of two states, (1 or 0), to which, 1 qubit obtains to possess the superposition to which it can achieve to possess the two values simultaneously. [1]

2. Literature review

- At the beginning of the last century, Quantum Computing had research by scientists, their thinking focused on elucidating the proposed dilemma of black body radioactivity [1,2]. In the last century I ingest all radiant energy, with the purpose of determining the spectral domain of a radiation through a quantized or discrete path processing [1]. The explorations led to inspire research study of energy, atoms, particles and identifying themselves as precursors of technology and quantum physics, the way they extended, and others [1,2]. Quantum switching focuses on the automatism of photon intercalation and superposition typologies, which serve to store and send information through qubits [3,4,5,6,7,8,9].
- They reveal that Newton, through many basic mathematical equation algorithms, narrated and foreshadowed that the trend of movement of astroids and planets experienced that the universe is essentially predictable [15].
- The theory of James Clerk Maxwell determines the electricity and magnetism that he managed to summarize through mathematical equations, algorithms that had great impacts on technological improvement in the twentieth century, such as television, mobile devices, and many more, being results of quantum evolution [16].
- The hypothesis of Niels Bohr undertook to perfect the quantum pilot exposing the organization of an atom, through algorithms of basic equations, exposed the possessions of an atom through quantum mechanics [17]
- The theory of Louis de Broglie, a French physicist experiment and pointed out that atomic orbits manage to expose that electron demonstrate behavior equivalent to waves [18]
- Traditional physics becomes accustomed to the autonomous universe, whether it knows itself or not, it manages to sharpen the senses, which in the end is the same, it does not modify, it does not bother, it continues its appropriate rules. In relation to quantum mechanics that does not happen; to observe something, is to conceive some limitation in it, it modifies its procedure, as it happens with quantum systems, when it is found in dissimilar perspectives equivalent to time, which is called superposition [19].
- The traditional opposition in relation to traditional and quantum physics, basic physics manages to presage in the vision as well as the speed of atoms, unlike the quantum hypothesis it is not possible to presage any of them [20]

3. Methodology

At present we continue with traditional computers that comprise of 1bit that obtains a maximum of two states, (1 or 0), to which, 1 qubit obtains to possess the superposition to which it can achieve to possess two values simultaneously, it means a technology high-performance and fast solves problems in real time, PCs have insufficient capacity, by the way, to process and store high volumes of information that Big Data technology requires to manage, likewise many industrial companies suffer from current technology, to carry out processes of financial transaction and data management Waterhouse that stores a wide variety of data, the data transaction is the information system and today it suffers threats due to the vulnerability of intruders, likewise, the symmetry and asymmetric encryption system are deficient, which does not guarantee reliability.

For the reasons stated about traditional technology, it is unfortunate oriented in two aspects:

- ✓ High deficiency to process and store information at all levels due to the disproportionate growth of the population, public and private institutions, industrialized companies that require high-performance technology in real time.
- ✓ High threat to the data and information system, due to the great vulnerability of intruders that distort and deform the information, nor the symmetric and asymmetric encryption system guarantee security, on the contrary, they lack reliability and confidentiality in the transmission of information, for what encoding algorithms are derailed by computer crooks.

In response to the diagnosis and prognosis of the problem, research studies on quantum technologies oriented to the computer, information system and security are carried out, through an analysis of the theories and hypotheses that already exist about the technology and the confrontation of ideas, be it come to consolidate, suggesting that the arrival of quantum technologies will be very timely and would solve daily problems at the local, national and international level, we understand that today emerging technologies are globalized worldwide.

3.1 Formulation of the Problem

Do you the arrival of quantum technologies will be timely and would solve everyday problems with the computer information, and security?

4. Analysis method (Experimental procedure / Numerical experiments)

4.1. Research Type and Design

The research of quantum technology is established as descriptive research, according to Cegarra (2012), they clarify that descriptive research is called theoretical research, since it disseminates the solution of problems and / or improves trends or opinions in a short and / or medium-term procedure, focused on achieving utopias, perfect for optimizing techniques or methodologies, with the purpose of increasing the most effective and productive capacities.

4.2. Research design

In the development of the research, the descriptive design was determined, it allows the researcher to be oriented to describe the context from the research study. According to experience, a design based on the theories that is generated through the collection and analysis of data was called, according to the theory of Hernandez (2014).

4.3. Shows

To determine a population, it includes all the theories obtained according to the author carried out in the research process and also verified through a qualitative measurement.

5. Results and Discussion

5.1. Results

In the research process it is obtained to discover the state of quantum technologies, as well as computers and information shows dissimilar systems that are being implemented, and that in the future many applications will be implemented, the following are pointed out:

- Quantum cryptography system, used at a high level, which ensures the development of the Swiss electoral system, as well as the use of basic technologies, optical fiber that integrates and links the State computer, being the only quantum system in the universe [23].

Quantum system in Teleportation is mentioned by information systems, it is not related to what is observed in science fiction, so no matter is transferred from a place X to a place Y, on the contrary it is the quantum information that is transported from space A to space B,

- quantum teleportation determines the possibility of entanglement of 2 photons that transmits the corresponding information from origin to destination [22].
- Quantum technology simulation systems, such as flight control simulator [24]
- Super conductor design that drives trains through magnetic systems [25]
- Possibilities of run simulations of drug atoms to show the preparation and interaction with various chemical compositions, also the chemistry of an atom, the process of the material, which are dependent on quantum mechanics, as well as a computer great for a simulation [26]
- Create consistent, more accurate, more sensitive sensors, which petrifies sufficient use in the environmental area. [21]

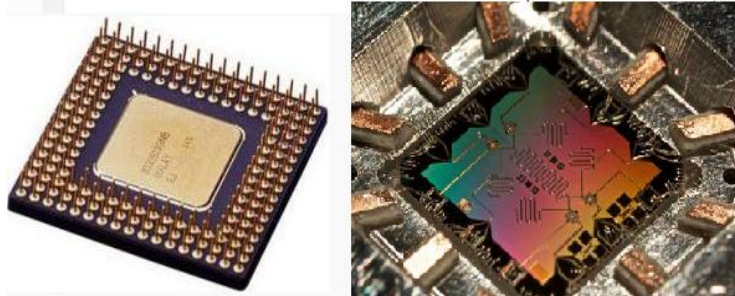
The hypotheses attest that the quantum computer will be able to confine the best way to encode hidden places, through encryption techniques through factorization of values, leaving the present traditional encryption methods obsolete, so that new paradigms will be reached on perimeter security. of the information [27]

5.2 Discussion

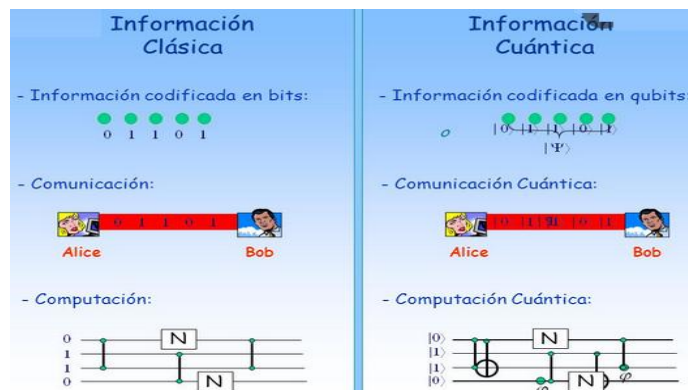
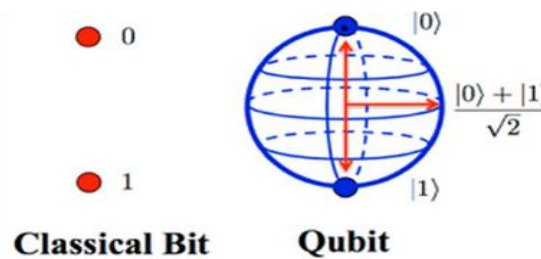
In the development of the research, various hypotheses were analyzed according to authors or pioneers of quantum technology, managing to understand a whole context about traditional technology, it is really unfortunate today, due to the growing disproportionate of technological globalization in the world, for which explains three fundamental aspects such as:

- ✓ That due to low computational power, limitations of algorithmic efficiency and small rooms of traditional computers, quantum computers are required due to their high computational power, quantum simulation and parallel computing that would eventually solve the problems, thanks to the 'qubits' as opposed to the 'bits', a huge computer capacity exponentially compared to the traditional computer.

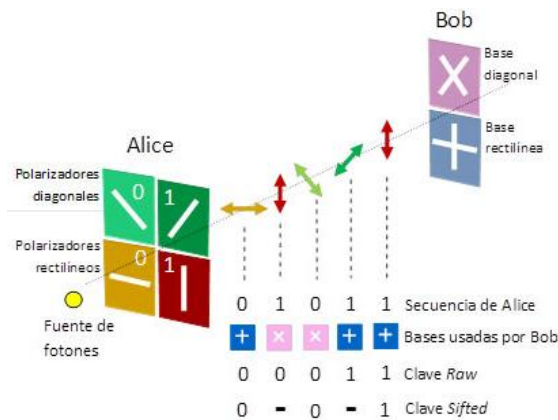
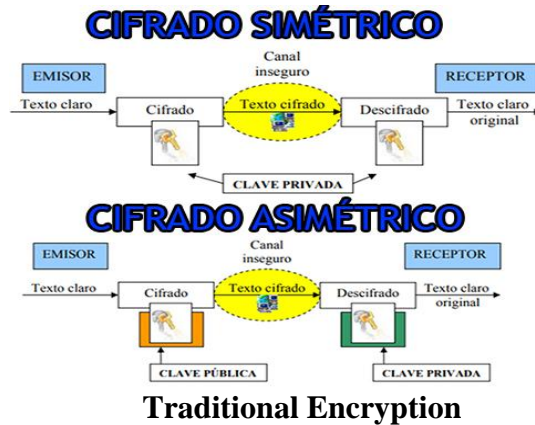
Classic Microprocessor Quantum Microprocessor



✓ High deficiency to process and store information at all levels due to the excessive growth of the population, public and private institutions, industrialized companies that require high-performance technology in real time. With the arrival of quantum technology, information will be encoded in qubits, its processing, quantification, storage and transfer of information forming data that travels at great speeds in the world.



✓ High threat to the data and / or information, due to the great vulnerability of intruders that distort and deform the information, nor the symmetric and asymmetric encryption system guarantee security, on the contrary they lack reliability and confidentiality in the transmission of information, so encryption algorithms are derailed by computer crooks. The arrival of quantum technology will solve information security in large dimensions.



Quantum Encryption

According to research studies on quantum technologies oriented to the computer, information and security, through an analysis of the theories and hypotheses that already exist about technology and the confrontation of ideas, it is come to consolidate, suggesting, that the arrival of the Quantum technologies will be very timely and would solve the daily problems of computers, information and security at all, understanding that today emerging technologies are globalized worldwide, which means a support and tool for the development of human society in the world real.

6. Conclusion

History shows that Einstein and Planck were the pioneers of the investigations that began by investigating their own definitions, looking for a path towards quantum physics based on coexistence, so that soon the notions and theories about the technology of quantum computers would crystallize.

The computing-oriented quantum technology is considered as the boom of the future decades, having a major first in the computing evolution of the last decades, showing new computational paradigms. The indications of the quantum computer require conserving the quantum transpositions for its most adequate and correct operation; it was also an object of analysis of research studies.

Continuing with the technological evolution the 2nd. quantum revolution, buy today in the ability to be competent to maneuver and conduct proper quantum systems and methods, atoms, photons, individual molecules. To the present after the 1st. quantum revolution, is managed to maneuver and operate sets, practical case, a laser that is designed to produce thousands and millions of photons, and now how many thousands of individual ones can be manipulated, provides new and great fields for

technological improvement, but apart from all this There are always doubts, despite so much development and technological advance, the intruders and criminals of computing achieve the same knowledge and get away with it.

According to the traditional cryptography system, it is speculated that the entire system is safe, since the apparent snooper cannot solve a difficult computer problem. With quantum cryptography, it is not possible to decipher quantum cryptographic codes; Unless the rules of physics are deciphered, a question remains, what guarantees that computer outlaws do not succeed in transgressing and breaking information systems?

In the hardware architecture there are many components, case of quantum gates that fulfills an essential function in the process and development of the quantum computer, but still continues the exploration of superconducting components, very suitable for their implementation. Today the quantum world through emerging technologies is called confusing and complex universe with great challenges and challenges, although science has not been able to solve, also to gradually point out the various advances achieved by science, it is still unknown the shortcomings that the universe of information oriented to reliability and security will face, also formulate and carry out more sensible and appropriate procedures to direct the reconstruction and implementation of the quantum computer for the benefit of human society.

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