

Green Wireless Internet Technology

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Abstract— Recent technological advances have led to an increase in the carbon footprint. Energy efficiency in the Green Wireless Internet Technology has been attracting a lot of researchers and designers over the last few years, to emerging area called Green Wireless Internet Technology. There are various factors (such as key enablers, communications, services, and applications) of Green Wireless Internet Technology, where efficient utilization of energy is needed to enable a green wireless internet technology environment. We explore these enabling technologies (such as the Internet, smart objects, sensors, etc.) can be efficiently deployed to achieve a green wireless internet technology. We also discuss various green wireless internet technology applications and standardization that are currently under way. Finally, we discuss some of the emerging challenges that are need to be addressed in the future to enable a green internet technology.

Index Terms— Green Internet Technology, Wireless, Sensors, Li-Fi

I. INTRODUCTION

The field of “Green Technology” is evolving group of methods and materials, from techniques for generating energy to non-toxic cleaning products. The present day expectations are that this field will bring innovation and changes in daily life of similar magnitude to the “Internet technology” explosion over the last two decades.

The Goals That Inform Developments In This Rapidly Growing Field Include:

- Sustainability: Meeting the needs of society in that can continue indefinitely into the future without damaging natural resources.
- “Cradle to Cradle” design: Ending the “cradle to grave” cycle of manufactured products, by creating products that can be fully reclaimed or re-used.
- Source reduction: Reducing waste and pollution by changing patterns of production and consumption
- Innovation: Developing alternatives to technologies – whether fossil fuel or chemical agriculture.

Examples of green technology subject areas

- Energy: The most urgent issue for green technology, includes the development of alternative fuels, new means of generating energy and energy efficiency.
- Green building: It includes everything - from the choice of building materials to where a building is located.

II. WHY GREEN INTERNET TECHNOLOGY?

In upcoming days, communications will allow users to access any service, at any time, on any device. This will require devices to go beyond the rigid specifications we have at present day to be able to adapt to a whole host of wireless networking, including the eventual 5G communication portal. Green communications is now adopting a major role at the system design. On one hand, devices are becoming more power hungry as more sophisticated applications and features, like navigation tool, is drawing more power from your handset device. Battery technology has not become more advanced enough to meet with these energy demands, leading towards very restricted standby time and battery life time. The situation is likely to get more worse as devices become smaller and always 'connected'. Matter of fact, an energy "trap" is starting to emerge where users will be bound to the nearest available power sockets instead of enjoying the full benefits of user mobility, that 5G and beyond is likely to offer. Reducing CO2 emissions is a major global environmental issue. From the past few years, wireless and mobile communications have become popular with consumers. Today's wireless access network consumes more than 50% of the total power consumption of mobile communication networks. Growth of mobile internet service usage is expected to drive the growth in wireless access data rates and usage. The current rate of power consumption per unit of data cannot be sustained as we move towards broadband wireless access networks and anticipated increases in wireless data traffic. Recently, information and communication technology accounted for 3% and 2% of the global power consumption and global CO2 emissions, respectively, which is a worrying statistic which is likely to take an upward trend with rise in market demand. Wireless network established themselves as a key and convenient means of communications that enables efficient and effective business operations. Today more than 5 billion people in the world have access to a mobile phone with internet. Mobile phones have become indispensable or undisputed in modern social and domestic life. Thus, like modern transportation systems, wireless networks are also here to stay for the foreseeable future. Hence, reducing the energy consumption of wireless networks is considered vital for the future. Looking through this line of research, the School of Engineering and Informatics at Bradford University [UK] ; 4TELL Research Group at the Institution de Telecomunicacoes [Aveiro-Portugal] ; School of Engineering & Engineering Technology at the ModibboAdama University of Technology [Yola-Nigeria]; School of Information Technology & Computing, American University of Nigeria; The Commonwealth ITU Group (UK) are all playing leading roles, and provided the inspiration for this IET special issue on Green Internet Technology. We aim at high quality research and practical case studies in the very essence of Green Networking and reconfigurable transceivers to provide design requirement and recommendations for the key components for tomorrow's ICT networks that will support a whole host of future services, IoT and E-applications with minimized energy costs.

III. SAVING ENERGY WITH CLOUD COMPUTING

Energy can be saved through one more technique that is cloud computing, namely the principle of outsourcing the programs and functions of one's own computer to service providers over the internet. This means sharing storage capacity with others. In this case, smaller devices, like mobile, are all that is required to handle large volumes of data.

Many of the clever ideas connected with Green Wireless Internet Technology and sustainability involves the joint use of purely virtual space. 'Digital sharing' is one more way of putting it. This is highlighted by IT fairs, such as CeBIT in Hanover, the largest computer show in the world. New ideas and programs for video conferences are presented here that are designed to prevent people from taking unnecessary flights and to be climate-friendly by shifting business meetings to their own desks. Even more can be done in this area: Energy can be saved by using a laptop instead of a desktop computer at workplaces or in home offices. This is because laptop components are energy optimized, primarily to ensure that the battery lasts long.

If modern LCD monitors are used, the result is even better. In contrast, traditional CRT monitors have high energy consumption. A classic green IT tip is to abandon the power-guzzling stand-by mode. We now have a huge range of different electrical sockets with on-off switches that should be deployed when using electronic devices for longer period of time.

IV. THE FUTURE INTERNET

Li-fi technology will in future enable faster, more reliable, eco-friendly internet connections, even when the rate of demand for the data usage has outgrowth the available supply for existing technologies, but will work very fastly alongside them.

Using light to deliver wireless internet will also allow connectivity in environments that do not currently readily support Wi-Fi such as aircrafts cabins, hospitals and hazardous environment
Light is already used for data transmission in fibre-optic cables and in point to point links.

V. CONCLUSION: PAYING ATTENTION TO ECO-FRIENDLY MATERIALS

Another program of green IT is the material used for electronic instruments, for the making of which several highly toxic metals are used. A huge deal of water is also used during production. The reserves of some of the elements, such as the rare earth elements (group of metals), are being depleted the world over. Recycling is therefore getting more importance these issues are being followed by the climate protection organization Germanwatch through an awareness-raising campaign called "makeITfair".

Lifecycle thinking and lifecycle engineering are problems that also figure in IT research. The Fraunhofer Institute of Reliability and Microintegration in Berlin, has helped to develop a particularly eco-friendly computer that has been awarded the European Union's Ecolabel. The iameco computer, made by the Irish company MicroPro, is a touchscreen PC housed in a wooden case and is low on energy consumption. the manufacturers say that, the computer requires 70% less power than traditional computers; it can be possible to recycle 98% of the computer, as many standard components have been built in, making it very easy to repair.

These and similar Green IT products can now be admired at a number of fairs. Besides CeBIT, there is Electronic Goes Green, which is held in Berlin every 4 years and which has developed into the largest meet in the world on achieving sustainability in the electronics industry.

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