

Li-Fi-based IoT



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What is



- **Li-Fi**, as coined by **Prof. Harald Haas** during his TED Global talk,^[1] is
 - bidirectional,
 - high speed and
 - fully networked wireless communications similar to [Wi-Fi](#).
- **Li-Fi** is
 - a subset of [optical wireless communications](#) (OWC) and
 - can be a complement to [RF communication](#) ([Wi-Fi](#) or [Cellular network](#)), or a replacement in contexts of [data broadcasting](#).

Lifi is

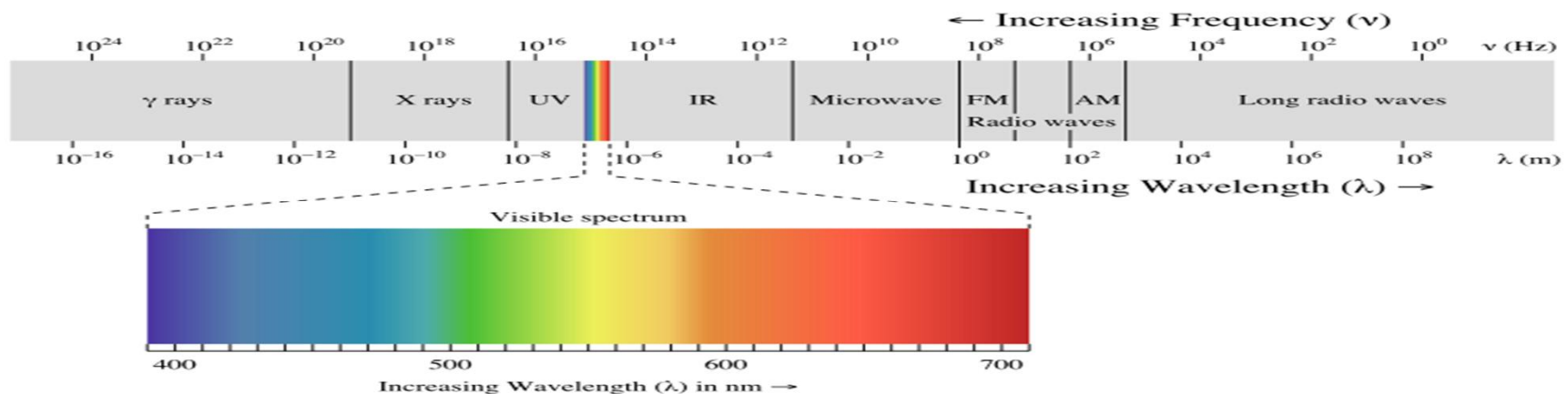


- Wireless and
- uses [visible light communication](#) or infra-red and near ultraviolet (instead of radio frequency waves) spectrum,
- part of [Optical wireless communications](#) technology, which carries much more information, and
- has been proposed as a solution to the [RF-bandwidth limitations](#).^[2]
- A complete solution includes an industry led standardization process.

Visible Light Communication



adalah **sistem komunikasi nirkabel*)** yang membawa informasi dengan cara memodulasi **cahaya tampak** yang aman bagi mata manusia

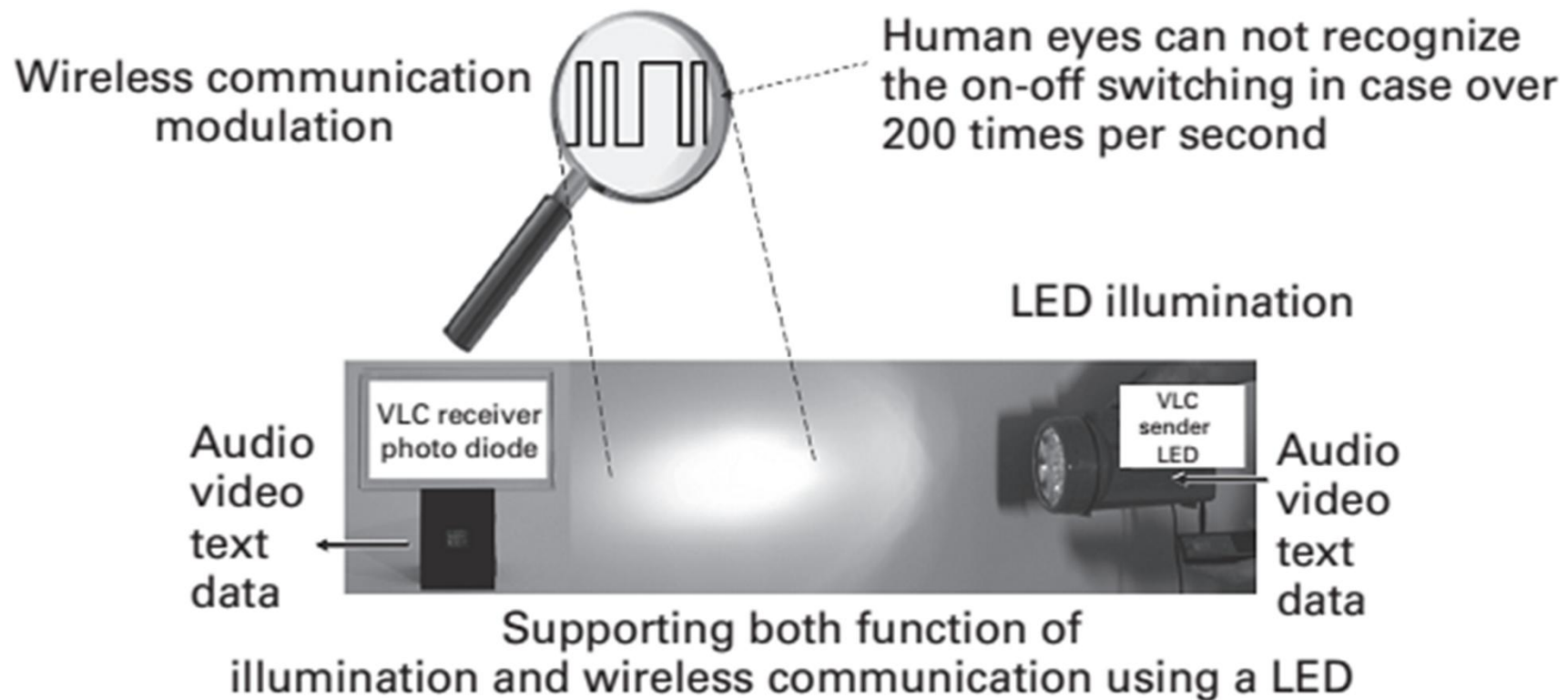


*) bagian dari Unguided-Optical Wireless Communication



- **Cahaya Tampak = Gelombang EM dengan spektrum $\sim 400 - 800$ THz ($750-375$ nm)*, *) ± 10000 spektrum frekuensi dapat digunakan**
- **Karakteristik umum :**
 - Visibility : secara estetika ramah
 - Aman : apa yang dilihat adalah apa yang dikirim
 - Kesehatan : aman bagi tubuh manusia (terutama mata)
 - Tidak berlisensi : tidak ada regulasi terkait frekuensi optik
 - Digunakan di daerah umum hingga terlarang (pesawat, rumah sakit, pesawat luar angkasa, pabrik petrokimia dll)

Prinsip Kerja VLC



IEEE 802.15.7

- Short-range wireless optical communication using visible light dipublikasikan pada 6 September 2011
- IEEE 802.15.7 Visible Light Communication Task Group telah mengembangkan standar VLC untuk PHY dan MAC pada tahun 2009; Study Group pada tahun 2008, dan Interest Group pada tahun 2007
- IEEE 802.15.7 VLC memiliki tiga jenis PHY yang bergantung pada penerapannya, yaitu PHY I, PHY II, and PHY III.

Let's see a video



- <F:\VLC\Visible Light Communication.mp4>

What is (IoT) Internet of Things?



- The **Internet of Things (IoT)** is
 - the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.^[1]
 - allows objects to be **sensed** and **controlled** remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit.
- Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure.
- Experts estimate that the IoT will consist of almost 50 billion objects by 2020.^[9]



- The term “Internet of Things” was coined by [British](#) entrepreneur [Kevin Ashton](#) in 1999.^[10]
- Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond [machine-to-machine communications \(M2M\)](#) and covers a variety of protocols, domains, and applications.
- The interconnection of these embedded devices (including [smart objects](#)), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a [Smart Grid](#),^[12] and expanding to the areas such as [smart cities](#).

Lifi-based IoT



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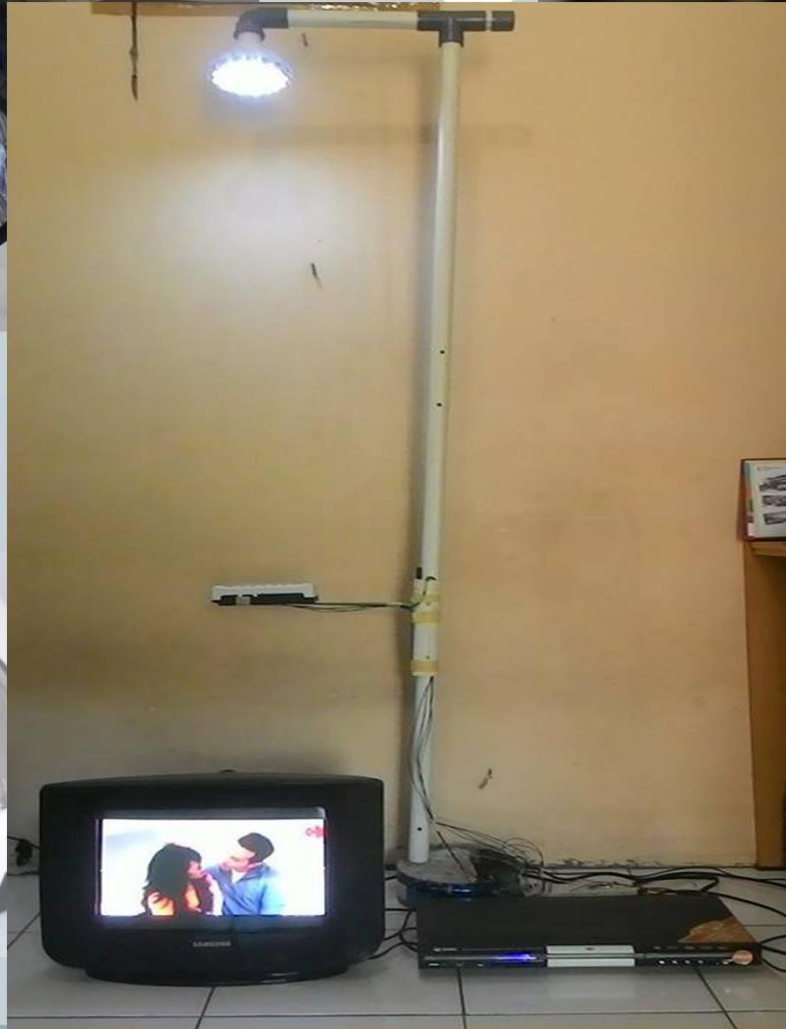
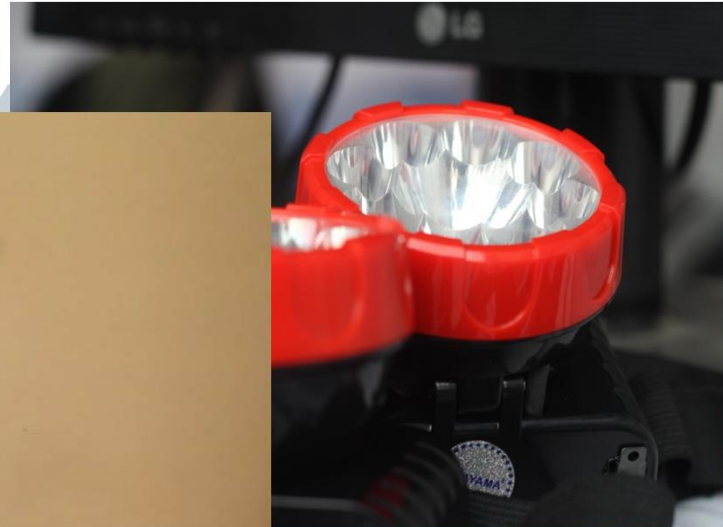
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Proof of Concept



Produk VLC



Tim RG VLC Indonesia



Meetup#15 IoT4bdg

Ruang Reka, October 3rd, 2015

Let's Enjoy someday!



Reference



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Thank you for your Attention!



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