State of the art

Here is a comparison table of different protocols that are used in smart home automation applications

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| --- | --- | --- | --- | --- |
| Protocol | Definition | Technology | Pros | Cons |
| Ethernet | Ethernet is a wired communications standard that allows large quantities of data to be sent very quickly. | Ethernet communications travel over physical cable made up of twisted pairs of wires. Data transfer speeds are 1 Gbps. CAT6 cables are actually capable of 10 Gbps speeds. | - data transmission speed  - communication distance  - cables are secured | - cost of installing the cables  - it needs switches  - need to plan properly your house for cables through walls |
| Wi-Fi | Wi-Fi is a wireless communication standard that allows interoperability and communications among different devices. | Wi-Fi communications travel across radio waves in the 2.4 GHz or 5 Ghz spectrum. Speeds range are from 10 Mbps to 100 Mbps. Wi-Fi is capable of streaming high-definition audio and video. | - data transmission speed  - range  - availability of the technology  - a router is less expensive than Ethernet cables | - many devices competing for bandwidth: phones, watches, thermostats  - power consumption of Wi-Fi devices  - security: needs setup |
| Zigbee | Zigbee is a wireless mesh network developed for low-speed, low-bandwidth, short-distance communications. | Zigbee radios operate primarily on the 2.4 GHz band. Data transmission speeds are at 250 kbps over 2.4 GHz radios and they are very robust for sending and receiving commands. | - mesh network  - low-power requirements  - Zigbee devices run on batteries, which also keeps them small. | - limited accessories on the market  - not that popular |
| Bluetooth | Bluetooth provides fast wireless data transmission but at short distances. Most smartphones include this protocol, which makes it a great way of connecting smart home accessories | Bluetooth uses the 2.4 GHz band. The system runs as a Master/Slave setup. Bluetooth 3.0 and 4.0 provide data transfer rates of around 24 Mbps. | - easy pairing method  - use very low amounts of power  - small accessories and battery operated devices.  - fairly inexpensive to implement | - it operates in the very busy 2.4 GHz frequency range  - short range of communications |

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| --- | --- | --- | --- |
| Parameter | Smart lighting | | |
| Product | LIFX Mini White | LIFX A19+ | Philips Hue White and Color + Bridge |
| Connectivity | Wi-Fi (no HUB needed), 802.11 b/g/n standards compliant | Wi-Fi (no HUB needed), 802.11 b/g/n standards compliant | Wi-Fi (requires bridge), Zigbee |
| Smart home integration | Home Kit, Amazon Alexa, Google Assistant | Home Kit, Amazon Alexa, Google Assistant | IFTT, Logitech, Amazon Alexa, Home Kit, Google Home and Assistant |
| Voice activation | Yes | Yes | Yes |
| Power Consumption | 60W-equivalent, consumes 8W power | 60W-equivalent, consumes 11W power | 60W-equivalent, consumes 10W power |
| Life-span | 22.8 years | 22.8 years | 20.000 hours ~ 2.3 years |
| Cost | $34/Bulb | $120 | $150 |

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